CONTINUATION OF THE
BULLETIN OF THE NUTTALL ORNITHOLOGICAL CLUB

The Auk

A Quarterly Journal of Ornithology

Vol. 60 OCTOBER, 1943 No. 4

PUBLISHED BY

The American Ornithologists' Union

LANCASTER, PA.

Entered as second-class mail matter in the Post Office at Lancaster, Pa.

Accepted for mailing at special rate of postage provided for in the Act of October 3, 1917, embodied in paragraph 4, section 538, P. L. and R., authorized May 15, 1920.

CONTENTS

FLIGHT-SPEEDS OF HAWKS AND CROWS. By *Maurice Broun* and *Ben V. Goodwin* (Plate 13) 487

NOTES ON THE BREEDING OF THE PINE SISKIN. By *Richard Lee Weaver* and *Franklin H. West* 492

NOTES ON THE BIRDS OF SOUTHAMPTON ISLAND, BAFFIN ISLAND AND MELVILLE PENINSULA. By *Reynold Bray* (with comments by *T. H. Manning*) 504

NOTES ON BIRDS OF THE KODIAK-AFOGNAK ISLAND GROUP. By *Victor H. Cahalane* 536

MAJOR CHANGES IN THE BIRD LIFE OF SOUTHERN LOUISIANA DURING SIXTY YEARS. By *E. A. McIlhenny* 541

AN ASPECT OF COLLECTORS' TECHNIQUE. By *T. T. McCabe* 550

NOTES ON THE CHIMNEY SWIFT. By *C. Brooke Worth* 558

ORIENTAL FORMS OF THE PYGMY WOODPECKER. By *James C. Greenway, Jr.* . . . 564

FACTORS IN THE INCUBATION BEHAVIOR OF THE COMMON TERN. By *Nelson Marshall* 574

GENERAL NOTES.—Grasshoppers and crickets eaten by Utah birds; Altitudinal nesting and breeding-range extension of the Wood Thrush; Wrens use duck down as nest lining; Unusual feeding habit of grackles and crows; Winter insect food of chickadees; Migrant Gray-cheeked Thrushes in song; Cowbird behavior; Cooper's Hawk carrying a nest of young Goldfinches (Plate 14, right figure); Gyrfalcon in Ohio (Plate 14, left figure); White Gyrfalcon in Quebec; The Dovekie in South Carolina; Wood Thrush in North Carolina in winter; Unusual breeding records from the Chicago region; Ring-necked Duck breeding in the Province of Quebec; Eastern Evening Grosbeck at Berwyn, Pennsylvania; Summer Tanager and White-eyed Vireo near Toledo, Ohio; Whistling Swan at Brookfield, Massachusetts; Scissor-tailed Flycatcher on Martha's Vineyard; Nesting of the Upland Plover in Baltimore County, Maryland (Plate 15); Mountain Bluebird in Minnesota; Additional bird records from Alaska; A second specimen of the fossil Guillemot, *Miocepphus; Rhinortha chlorophaea* in Borneo; Bachman's Sparrow in Maryland (Plate 16); Nevada Savannah Sparrow and Pine Siskin in Louisiana and Mississippi; Hooded Warbler in North Dakota; A third record of the American Redstart from New Mexico; A new grosbeak from northwestern Thailand; A correction 589

RECENT LITERATURE 609

NOTES AND NEWS 632

OBITUARIES: Elliott Baird Coues, Charles Kennedy Knickerbocker, Marcus Ward Lyon, James Moffitt, Miss Mary O'Brien, Anthony Wayne Robinson, George Herbert Ross, Dr. Ellison Adgar Smyth, Jr., Gardner Perry Stickney, Harvey Adams Surface, Herbert Lando Thowless, William Henry Trotter 634

INDEX TO VOLUME 60 641

TITLE-PAGE AND CONTENTS i

VIEW OF HAWK MOUNTAIN, A SPUR OF THE KITATINNY RIDGE, IN EAST-CENTRAL PENNSYLVANIA. THE SPEED-OF-FLIGHT EXPERIMENTS WERE CONDUCTED ALONG THE CREST OF HAWK MOUNTAIN.

PHOTO BY MAURICE BROUN

Photo by Maurice Broun

VIEW OF HAWK MOUNTAIN, A SPUR OF THE KITTATINNY RIDGE, IN EAST-CENTRAL PENNSYLVANIA. THE SPEED-OF-FLIGHT EXPERIMENTS WERE CONDUCTED ALONG THE CREST OF HAWK MOUNTAIN.

THE AUK

A QUARTERLY JOURNAL OF

ORNITHOLOGY

VOL. 60 OCTOBER, 1943 No. 4

FLIGHT-SPEEDS OF HAWKS AND CROWS

BY MAURICE BROUN AND BEN V. GOODWIN

Plate 13

EXPERIMENTS in timing the flight-speeds of hawks at Hawk Mountain Sanctuary, in east-central Pennsylvania, were carried out during a period of six weeks, from late September to early November, 1942. Telephonic communication was used, over a measured course of t- -thirds of a mile, along the sharp crest of the wooded ridge famous for its autumn migrations of raptores and other birds. The ridge used for the experiments runs 11¼ degrees south of west, is 1,500 feet above sea-level, and represents a spur of the Kittatinny Ridge, which traverses several states from southeastern New York through Virginia. For a detailed description of Hawk Mountain Sanctuary, and of the hawk flights, the reader is referred to an earlier report (1939). A stop watch was used, also a portable anemometer, both instruments being generously loaned by Lehigh University. Wind velocities were computed a few feet above the tree-tops on the crest of the ridge. We are indebted to Wm. H. Fricke for his yeoman services in helping the junior author to erect the telephone wires, and to Robert M. Giegler and Carl Siebecker for their coöperation as "hawk-spotters."

Flight-speed records were obtained of 152 hawks of 14 species, and of 15 Crows. The meagerness of the data may surprise some readers, in view of the passage and observation of many thousands of hawks and Crows along this ridge. Rarely do any of the migrating raptores fly 'on the beam'; hence the difficulty of accumulating reliable flight-speed data. Time and again a 'timed' subject would progress along the measured course, then suddenly swerve, or circle, or drop into the woods. There were many days when no birds were timed. Thus the 167 records listed here represent the speeds of only those birds whose passage was straight and uninterrupted.

The importance of securing precise data on wind direction and velocity was realized, and this information was patiently accumulated in order to present, if possible, a complete picture of the ground-speeds of the birds, as has been suggested and so ably demonstrated by Allen (1939). Yet, though these important factors of wind are applicable in most instances to ground-speeds of birds, a glance at the tables will reveal that, at Hawk Mountain, wind velocity has no relationship to the speed of flight of the hawks, since the hawks utilize the *up drafts*—an unmeasurable factor—created by the winds. Thermal up drafts also play an important part in these flights.

In most instances, and especially in the case of the Sharp-shinned Hawks, the birds rarely flapped when the wind increased above 15 m. p. h. The birds then folded their wings as though in diving flight, in order to ride the strong up drafts. When a hawk appeared to be working hard (flapping vigorously), as did the Sharp-shin timed at 52 m. p. h. in a 20-mile wind, the bird was apparently struggling to avoid being blown off its course, and between flaps it reduced its wing area in the manner just described.

As for the Crows, here again the effect of wind on their flight could not be determined. A timed Crow, 'low over the valley,' though pursuing a level flight parallel with the measured section of the ridge, would obviously encounter a different wind velocity than that measured on the crest of the ridge. Incidentally, our speeds of migrating Crows approximate closely the Crow speeds of from 25 to 32 m. p. h. recorded by Rathbun (1934).

Great variation in speed will be noted in some species, as in the case of the Sharp-shinned Hawks, of which 37 individuals ranged from 16 m. p. h. to 60 m. p. h. The speeds of the Ospreys show even greater variation; 16 birds ranged from 20 to 80 miles per hour. The Osprey sailing along the ridge at 80 m. p. h. was evidently making use of a very strong thermal, so that the bird was in reality in steep diving flight without losing altitude; this particular bird was also witnessed by Robert M. Giegler and Henry Rosenkrantz, both of Penn State College. It may be relevant to recall Miss Cooke's words that "The age of the bird, the state of its plumage, and other physical conditions modify its powers of flight and thus affect its speed" (1937).

Our data provide but a single example of air speed, that of a Sharp-shinned Hawk, flapping continuously, making 34 m. p. h.

Since reliable records of flight-speeds of birds, and hawks in particular, are none too plentiful, the following data are set forth for their intrinsic interest, with the hope that they may be of value to other investigators along these lines.

TABLE 1

Species	*Miles per hour*	*Wind direction*	*Wind velocity*	*Comments*
Turkey Vulture:.....	34	N.W.	15.0	Sailed mainly, low over valley
Eastern Goshawk:....	38	N.W.	9.0	Along crest of ridge
Sharp-shinned Hawk:.	16	N.W.	7.5	Flapped continuously
	17	N.W.	4.5	Flapped continuously
	18	N.W.	7.7	Flapped continuously
	18	N.W.	10.1	Flapped mainly, high over valley
	18	N.	4.0	Sailed mainly, high over valley
	18	W.N.W.	5.0	Flapped continuously, low
	20	N.W.	25.0	Sailed mainly, over valley
	22	W.N.W.	5.0	Flapped almost continuously
	22	N.W.	7.0	Sailing, only 3 flaps, high
	22	N.W.	4.5	Flapped continuously
	23	N.W.	12.0	
	23	N.N.W.	19.0	Flapped mainly, along crest of ridge
	24	W.N.W.	4.0	Flapped continuously
	24	W.N.W.	3.0	Sailed and flapped, along crest
	24	N.W.	10.0	Sailed and flapped, low on slope
	25	N.W.	15.0	Flapped, over crest of ridge
	26	N.W.	25.0	Continuous sail, high over valley
	26	N.W.	15.0	
	26	N.W.	8.0	Flapped and sailed over crest
	26	W.N.W.	8.5	Flapped continuously over crest
	27	N.W.	15.0	
	28	S.W.	5.0	Flapped mainly, near crest
	30	S.S.E.	15.0	Flapped entirely, near crest
	30	S.E.	15.0	Flapped entirely, near crest
	30	N.W.	20.0	Sailing mainly
	32	S.S.E.	15.0	Flapped entirely, below crest
	32	N.W.	12.0	Sailing mainly
	32	N.W.	7.0	Sailed and flapped alternately
	34	No wind!		Flapping continuously
	36	N.W.	18.0	Continuous sail
	41	W.N.W.	4.0	Flapped, along crest
	48	S.E.	10.0	Flapped mainly, below crest
	52	S.E.	10.0	Flapped mainly, below crest
	52	N.W.	20.0	Flapped mainly, along crest
	54	N.W.	20.0	Sailed mainly, low over valley
	54	N.W.	25.0	Sailed entirely high over valley
	60	N.W.	20.0	Sailed entirely high over valley
Cooper's Hawk:.....	21	N.W.	4.5	
	23	N.W.	14.8	Sailed mainly
	23	N.W.	11.7	Sailed mainly
	23	W.N.W.	4.0	Sailed and flapped alternately
	26	N.W.	20.0	Sailed mainly, high over ridge
	26	N.W.	25.0	Flapped most of way
	26	N.W.	15.0	Flapped mainly, out over valley
	26	N.W.	3.0	Flapped and sailed alternately
	30	N.W.	15–20.0	Flapped mainly, along crest
	32	N.W.	18.0	Flapped continuously
	40	S.E.	10–15.0	Flapped mainly, above crest
	55	N.W.	4.0	Flapped mainly, above crest
Eastern Red-tailed Hawk:.....	20	N.W.	14.8	Almost continuous sail
	22	N.W.	18.0	This and following bird together; sailed mainly
	22	N.W.	18.0	
	22	N.W.	8.5	Sailed, above crest of ridge
	22	N.W.	7.0	Almost continuous sail
	23	N.W.	12.5	Continuous sail

TABLE 1—Continued

Species	*Miles per hour*	*Wind direction*	*Wind velocity*	*Comments*
Eastern Red-tailed Hawk:	23	N.W.	10.0	Continuous sail
	24	N.N.W.	15.0	Continuous sail
	24	N.W.	15.0	Continuous sail
	25	N.W.	12.0	Flapped occasionally, over valley
	25	N.W.	5.5	Continuous sail low over valley
	25	N.W.	14.0	Sailed, high over crest of ridge
	25	N.W.	18.0	Sailed, high over north slope
	25	N.W.	15.0	Sailed, high over north slope
	26	N.W.	4.0	Continuous sail, high over crest
	26	N.W.	4.0	Continuous sail, high over crest
	26	N.W.	4.0	Continuous sail, high over crest
	27	N.W.	12.0	Flapped occasionally, high
	27	N.W.	11.7	Continuous sail, along crest
	27	N.W.	8.5	Continuous sail, along crest
	27	N.W.	8.5	Continuous sail, along crest
	27	N.	11.0	Continuous sail, along crest
	28	N.W.	12.0	Continuous sail, along crest
	28	N.W.	11.7	Continuous sail, along crest
	28	N.W.	11.7	Continuous sail, along crest
	28	N.W.	11.7	Continuous sail, along crest
	28	N.W.	15.0	Continuous sail, along crest
	28	N.W.	10.0	Continuous sail, low over slope
	30	N.W.	20.0	Sailed mainly
	30	N.W.	5.7	Continuous sail, high over valley
	30	N.W.	22.0	Continuous sail, high over valley
	30	N.W.	15.0	Sailed mainly, along crest
	30	N.W.	15.0	Continuous sail, high over ridge
	30	N.W.	13.0	Continuous sail, along crest
	30	N.N.W.	19.0	Continuous sail, high over crest
	31	S.E.	11.9	Flapped and sailed alternately, low
	31	N.N.W.	11.3	Continuous sail, along crest
	32	S.E.	0–5.0	Flapped and sailed, along crest
	32	N.W.	8.5	Continuous sail, high over ridge
	32	N.W.	15.0	Continuous sail, high over ridge
	32	N.N.W.	11.0	Continuous sail, high over ridge
	32	N.N.W.	13.0	Continuous sail, high over ridge
	32	N.N.W.	4.0	Continuous sail, off south slope
	33	N.W.	8.5	Continuous sail, high over ridge
	33	N.W.	10.0	Continuous sail, high over ridge
	33	N.N.W.	11.0	Continuous sail, along crest
	34	N.N.W.	8.5	Continuous sail, high over ridge
	35	N.N.W.	7.0	Continuous sail, high over ridge
	35	N.W.	12.0	Flapped occasionally, very high
	35	N.W.	4.0	Flapped occasionally, very high
	38	N.N.W.	8.0	Flapped occasionally, very high
	40	N.N.W.	7.0	Flapped occasionally, very high
	40	N.N.W.	7.0	Flapped occasionally, very high
	40	N.N.W.	3.0	Flapped occasionally, very high
Northern Red-shouldered Hawk:	18	N.W.	25.0	Flapped continuously
	23	N.W.	9.7	Flapped occasionally
	26	N.W.	9.7	Flapped occasionally
	31	N.W.	7.0	Flapped mainly
	32	N.N.W.	7.0	Flapped mainly
	34	N.W.	6.0	Flapped mainly
	34	N.W.	6.0	Flapped mainly
Broad-winged Hawk:	20	N.W.	10.0	Sailed and flapped, low over crest
	30	S.E.	10.0	

TABLE 1—Continued

Species	*Miles per hour*	*Wind direction*	*Wind velocity*	*Comments*
Broad-winged Hawk:	30	S.S.E.	10.0	This and next together, sailing along crest of ridge
	30	S.S.E.	10.0	
	32	S.E.	5–10.0	*Flock of 43 birds*, sailed mainly
	32	S.E.	5–10.0	Sailed mainly
	40	S.E.	15.0	This and next together, sailing along crest of ridge
	40	S.E.	15.0	
American Golden Eagle:	28	N.W.	8.5	Flapped occasionally
	32	N.W.	13.5	Sailed continuously
Bald Eagle:.....	36	S.E.	10.0	Flapped and sailed alternately
	44	N.N.W.	15.0	Sailed continuously
Marsh Hawk:.....	21	N.W.	11.7	Flapped occasionally
	22	W.N.W.	9.0	Flapped and sailed alternately
	34	N.W.	6.0	Flapped continuously
	38	S.E.	15.0	Sailed mainly
Osprey:.....	20	N.W.	18.0	Sailed high over north slope
	20	N.N.W.	4.0	Sailed, along crest of ridge
	27	N.W.	12.0	Sailed, along crest of ridge
	28	N.W.	18.0	Sailed low, along crest of ridge
	29	N.W.	12.0	Sailed mainly along crest of ridge
	36	S.E.	15.0	Sailed along crest of ridge
	36	N.W.	12.0	Sailed well out over valley
	38	S.E.	15.0	Sailed along crest of ridge
	38	S.E.	5.0	Flapped continuously
	39	S.E.	15.0	Sailed mainly
	40	S.E.	15.0	Flapped and sailed alternately
	44	S.E.	10.0	Sailed mainly along crest of ridge
	48	S.E.	15.0	Flapped and sailed alternately
	56	N.W.	25.0	This and next bird together, both sailed mainly
	56	N.W.	25.0	
	80	N.W.	4.0	Continuous sail except for 2 half flaps
Duck Hawk:.....	28	N.W.	11.3	Flapped continuously
	30	N.W.	25.0	Flapped continuously
	32	N.W.	4.0	Flapped and sailed alternately
Pigeon Hawk:.....	28	N.W.	12.0	Flapped mainly
Eastern Sparrow Hawk:	22	N.W.	18.0	Flapped entirely
	23	N.W.	25.0	Flapped entirely
	24	N.N.W.	4.0	Flapped entirely
	36	N.W.	15–20.0	Flapped entirely
Eastern Crow:.....	17	N.	15.0	Low, along north slope
	19	N.W.	22.0	Along crest of ridge
	23	N.W.	10.0	Low, well out over valley
	23	N.W.	9.8	Low, well out over valley
	25	N.W.	10.8	Low, well out over valley
	25	N.	17.0	High over valley
	26	N.W.	20.0	Low along north slope
	27	N.W.	8.2	Low, out over valley
	27	N.E.	6.1	Low, out over valley
	27	N.N.W.	15.0	High above ridge
	28	N.W.	10.0	Low along north slope
	29	N.W.	3.0	High over south slope
	30	N.W.	25.0	Low, flock of 11 birds
	30	N.N.W.	13.0	High, out over valley
	35	N.	1.0	Low, out over valley

TABLE 2

Species	*Total records*	*Range of speed*	*Average speed*	*Median*
Turkey Vulture	1	34	—	—
Eastern Goshawk	1	38	—	—
Sharp-shinned Hawk	37	16–60	30.0	26
Cooper's Hawk	12	21–55	29.3	26
Eastern Red-tailed Hawk	54	20–40	29.0	28
Northern Red-shouldered Hawk	7	18–34	28.3	31
Broad-winged Hawk	8	20–40	31.7	32
American Golden Eagle	2	28–32	30.0	—
Bald Eagle	2	36–44	40.0	—
Marsh Hawk	4	21–38	28.7	—
Osprey	16	20–80	41.5	38
Duck Hawk	3	28–32	30.0	30
Pigeon Hawk	1	28	—	—
Eastern Sparrow Hawk	4	22–36	26.2	—
Eastern Crow	15	17–35	26.0	27

REFERENCES

ALLEN, F. H.
1939. Effect of Wind on Flight Speeds. Auk, 56: 291–303.

BROUN, M.
1939. Fall Migrations of Hawks at Hawk Mountain, Pennsylvania, 1934–1938. Auk, 56: 429–441.

COOKE, M. T.
1937. Flight Speed of Birds. U. S. Dept. Agric., Circ. 428.

RATHBUN, S. F.
1934. Notes on the Speed of Birds in Flight. Murrelet, 15: 23–24.

Hawk Mountain Sanctuary
R. D. Orwigsburg, Pennsylvania

NOTES ON THE BREEDING OF THE PINE SISKIN

BY RICHARD LEE WEAVER AND FRANKLIN H. WEST

INTRODUCTION

AN unusual occurrence of Pine Siskins (*Spinus pinus pinus*) throughout New England during the winter and spring of 1941 was followed by the nesting of some of the birds south of, or at lower elevations than, their usual breeding range. This afforded an opportunity to make a detailed study of the breeding habits of the species at Hanover, New Hampshire, where one nest was observed by fifteen members of the Dartmouth Natural History Club from the time that the nest was being built until the young had departed from it.

Previous records of Siskins breeding in New England are relatively scarce and detailed observations made during the nesting period are rare. The general behavior pattern in regard to nesting is fairly well known from casual observations and by comparisons with re-

lated species, but many questions have remained to be answered concerning territory, incubation, fledging, and care of the young by the adults. This study will help to answer some of these questions and to verify suppositions made concerning the species.

Bagg and Eliot (1937) summarize very well what is known of the relationship of the Siskin to other finches and the characteristics which make this bird such an object of interest in regard to its movements and life history. They say:

> "The Siskin's closest relatives are, we suppose, the American Goldfinch, now classed as Spini, too, but it is also very close to the Crossbills, and to the Redpolls, and its flocking, and feeding, and breeding habits are more like those birds than the Goldfinches. Like both, it prefers to keep in sociable flocks, restlessly bounding with wheezy little chatterings all over the countryside. Reproduction necessities require less than a month and may be satisfied at almost any season, this pair or that dropping out of the flock-life, wherever they happen to be, but the flock appears to have a continuous existence and almost limitless range. This freedom from dietary, seasonal, territorial, or geographical restrictions makes the Siskin even more than the Crossbill, who after all must have cones—errant par excellence; now absent for months at a time, now abundant and tame, now a wild barely pausing transient and anon a sporadic breeder!"

Todd (1940) also points out that not all birds breed every year, which probably explains their presence at unexpected times and out of their ordinary breeding range.

Breeding Records in the Northeast

The Pine Siskin is a common but somewhat irregular resident in Maine, New Hampshire, and Vermont, breeding usually above 3,000 feet, and is a bird of the Canadian Zone. It is a casual breeder in New England south of these states, having a very discontinuous range (Forbush 1929). Glover M. Allen (1903) says that the Siskin is a common permanent resident of the Canadian region, and occurs also throughout the lower part of New Hampshire as a fall and winter visitant. He also points out that a few are almost always to be found in the lowland valleys of the White Mountains. Wright (1911), in writing of the bird life of the Jefferson region of New Hampshire, says that the distribution of the species in the forests of the Presidential Range throughout the summer also indicates that it nests sparingly there.

Siskins have been known to breed sporadically south of New England, with records from the Catskills, the Hudson Valley, and the Alleghenies in western Pennsylvania. They have also been known to summer occasionally in the southern Appalachians which might mean that they breed there.

One of the earliest nesting records of the Siskin was made at Cambridge, Massachusetts, in May, 1859. It was reported by Baird, Brewer and Ridgway (1874). J. A. Allen (1870) reported a record made by William Brewster at Gorham, New Hampshire, in August, 1869. Brewster also recorded the bird as nesting at Lake Umbagog in Maine and New Hampshire (Griscom 1938). Brewster further said in his diary that they were often found breeding or wintering and were sometimes entirely absent at one season or another. He gave the year of 1873 as one when nesting occurred in great numbers in two definite periods—June–July and July–August.

Gilman and Edwin B. Frost found two nests with eggs in the Dartmouth College Park at Hanover, New Hampshire, April 17 and 18, 1878, which were reported by Glover M. Allen (1903). That same year C. Hart Merriam (1878) observed large flocks and nesting occurrences in northern New York.

In May, 1883, at Newton, Massachusetts, a nest, two eggs, and a female were collected by Dean W. Park, reported by Brewster (1906). At the same time, nesting occurred at Ossining, New York, as was observed by Fisher (1883). J. A. Allen (1887) witnessed nesting at Cornwall-on-Hudson, New York, May 3, 1887. Nesting was observed at Remsen, New York, April 4, 1889, and in Essex County, New York, in 1905, reported by Eaton (1914). Faxon and Hoffman saw adults on Mt. Greylock, Massachusetts, on July 16, 1888, which were thought to be nesting (Bagg and Eliot 1937).

Since 1900, numerous other records of nesting have been made in New England and nests have been found as far south as Warren, Pennsylvania. Bagg and Eliot (1937) report nests or obviously breeding adults at Brattleboro, Vermont, in 1907; Bethel, Vermont, in 1908; Woodstock, Vermont, April 19, 1925, by Richard Marble; Southampton, Massachusetts, April, 1927, by Cross and Woods.

The Siskin was found nesting at Warren, Pennsylvania, in 1912 by R. B. Simpson (1912) who found ten nests during April and May. He found two nests at Warren again in 1925, the same year that George Sutton (1928) located a nest with young at Hull, Potter County, Pennsylvania, and several old nests in Pymatuning Swamp, near Hartstown, Crawford County, Pennsylvania.

OCCURRENCE IN NEW ENGLAND IN 1941

Thousands of Siskins were present during the winter and spring of 1941 throughout New England. Flocks of 250 to 1,000 birds were reported in Massachusetts during March and a general increase was noted in New England during April. There was a general tendency

to nest shown by small portions of these spring flocks, with definite evidence of nesting noted at Springfield and Northampton, Massachusetts, and Hanover, New Hampshire. There was a general movement northward during May, but individuals remained scattered throughout New England during the entire month, with some birds present during the first part of June. Nest building was seen at Springfield and two juveniles were observed at Northampton. Thus Siskins remained south of their normal breeding range throughout the spring of 1941 and some nested (Bull. New Eng. Bird Life, Jan.–June, 1941).

At Hanover, New Hampshire, 429 Siskins were counted on the 1940 Christmas Bird Count, and flocks of 15 to 20 could be seen throughout February and early March. By the end of March and the beginning weeks of April, the flocks increased in size, having 50 to 100 birds in them. The peak of abundance was reached about mid-April. By the end of the month and throughout early May, as many as 200 to 800 birds were counted in flocks moving northward. Many of the birds present during March had remained until May; some of them had been marked with colored tail plumes and could be seen throughout the period. Nesting occurred during April and May and some individuals remained through June and into July, supposedly the breeding birds and their young.

NESTING

As a result of this large influx of birds throughout the spring, a few birds were found to be nesting at Hanover and numerous others were suspected of nesting. This verifies Glover M. Allen's statement (1903) in regard to their distribution and abundance in New Hampshire. He says: "After a winter in which they have been plenty, stray birds seem to drop out as the main flight receded northward and these may sometimes breed at lower elevations." It was also true that nesting followed periods of large concentrations throughout the winter and spring at Cambridge, Massachusetts, in 1859; Lake Umbagog, Maine, in 1878; northern New York, in 1878; Ossining, New York, in 1883; and at Warren, Pennsylvania, in 1912.

Nesting at Hanover has undoubtedly occurred between 1878 and 1941 unobserved, as an old nest was discovered in the College Park in 1941 that was being dismantled by one of the Siskins which was building a new nest nearby. Three nests, containing eggs, were found in April, 1941, and another one was found being visited by a pair of birds but situated in such a position that examination was impossible. It probably never was used, for the activity did not con-

tinue long enough for a normal nesting. All of the nests were situated in the Dartmouth College Park in close proximity to each other and near the sites of the nests found there by the Frosts in 1878. The first nest found was the only one to be completed; the other two with eggs were destroyed, presumably by red squirrels. Dr. and Mrs. Frederic P. Lord of Hanover were responsible for the discovery of the first nest, finding it in their yard, which is situated on the western side of the Park. In the spring of 1943 Dr. and Mrs. Lord discovered another pair of Siskins nesting in their yard. The nest was completed March 31, but was situated so that close observation of the nest contents was impossible. All nesting activity ceased abruptly April 22, without the cause of desertion being determined.

METHODS OF STUDY

Upon the discovery of nest building by Dr. and Mrs. Lord, a party of fifteen observers of the Dartmouth Natural History Club began a program of observation which lasted until the young left the nest. Dr. and Mrs. Lord, Richard Weaver, Louise Forsyth, Wesley Lanyon, and Sally and Susan Neidlinger of Hanover, and the following students of Dartmouth College assisted with the observations: A. Flag Southerland, Franklin H. West, Raymond Wattles, John Earle, Robert Blair, Edward Porter, Gilbert Anthony, Robert Thorne, and Robert Hamill. Observations covered as few as three and as many as ten hours each day for thirty-seven days.

At first, observations were made from a chair at a distance of fifteen yards by the use of binoculars, so that nest building and egg laying would not be interrupted. After the eggs were laid, a blind eighteen feet high was constructed ten feet from the nest and the observations were continued from there. The eggs and young were never handled for measurements or descriptions, nor were the adults banded—in fact, nothing was done which might interrupt the nesting as we were very anxious to check the incubation period and the time spent in the nest by the young after hatching. All observations of nest contents were made with a mirror on a long pole.

NEST BUILDING AND EGG LAYING

The first signs of nesting were observed on April 8 and 9 when two birds were seen continuously in each other's company making attempts to dismantle an old oriole's nest, followed by repeated trips to a Norway Spruce nearby. The nest was found April 9, having the outer ring formed and a thin layer across the bottom. Some

strips of cloth placed under the tree on April 8 had been utilized in the nest construction.

Three days were required to complete the outer layers and bottom of the nest. On the fourth day, lining materials were added. Several attempts to break off small dead twigs from the nest branch were observed. After the fifth day, materials were added to the nest sporadically until the eggs were laid. On the seventh day, the female began making trips to the nest without materials and sitting on it for short periods. This procedure continued with the trips to the nest becoming more frequent and the time spent on the nest increasing to as much as fifty minutes before the tenth day, April 18, when the first of the two eggs was laid. The second egg was laid the following day.

The female did all of the work of building the nest. The male accompanied her on most of the trips to and from the nest during the building and was very attentive to her during the entire period prior to the laying of the eggs. This was also observed by Fisher (1883), J. A. Allen (1887), and Simpson (1912). Fisher also observed the male following the female about, "but the male usually stopped on nearby perches to sing and to await the return of the female with nesting materials." The male, from perches near the nest, often sang a very melodious song which had somewhat the quality of that of a Canary, Goldfinch, or Purple Finch. This rather pretty song is in contrast to the statement by Roberts (1936) that the only song is a squeaky performance, and it bears out his assumption that "it seems possible his greater vocal powers are not discovered."

POSITION AND CHARACTER OF THE NESTS

All four nests found in 1941 at Hanover were in Norway spruces as was one of those found in 1878. The other one found in 1878 was in a small pine. The four nests found in 1941 were in trees sixty to eighty feet tall, while those found in 1878 were in small trees five to seven feet tall, even though there were some sizable conifers in the park at that time. The four 1941 nests were in similar situations, being on branches extending well out from the trunks of the trees where the diameters of the branches were less than one inch. The nests were placed immediately under the shelter of a smaller branch overhanging them, so that they received protection from snow and ice. All four nests were situated more than fifteen feet above the ground; three were below twenty feet and the fourth one was at about thirty-five feet.

The nest found by Marble in April, 1925, at Woodstock, Vermont,

was destroyed by a severe ice storm soon after incubation began. Swenk (1929) reports a nest found in March in Nebraska which had been built and then filled with snow before the eggs were laid. The female returned two days later after the snow had melted and laid her eggs, but the nest subsequently fell to the ground, either as a result of the snow or faulty nest construction.

Of the ten nests found in 1912 by Simpson (1912), three were in white pines, three in hemlocks, one in a yellow pine, and three in spruces. These ten nests varied in elevation from six to thirty-five feet and averaged 17.4 feet, and most of them were placed near the ends of the branches. Sutton's (1928) nests were in hemlocks; Fisher's (1883) in a red cedar; and J. A. Allen's (1887) was in a Norway spruce.

The outer structures were composed of coniferous twigs, strips of cloth, string, and shredded bark, while the inner linings contained fine rootlets, twigs, moss, and some wool obtained from a sheep yard nearby. The nests were very compact, having walls one and one-half inches thick. They measured four inches across and one and one-half inches high on the outside, and the nest cavities averaged two inches across and one and one-quarter inches deep. These measurements correspond closely with those given by J. A. Allen (1887) and Fisher (1883).

The nest described by J. A. Allen was very similar in construction to those found in 1941, having string, thread, tape, and rootlets as a base, with a cup-shaped structure of coarse and fine rootlets and soft vegetable fibre, lined with black horsehair. Fisher described the outer part of the nest he found as containing fine twigs from Norway spruce, loosely placed together with a few rootlets, and with pieces of string interwoven. He also said the lining was very compact, made up of hemp-like material, horsehair, bits of thread, feathers, rootlets, and like substances. All of these descriptions adhere closely to that given originally by Baird, Brewer, and Ridgway (1874) of the nest found in 1859. This nest also contained some wool, as in the nests found in 1941 at Hanover. Swenk (1929) portrays the nest of the Siskin in two excellent photographs, showing top and side views.

COPULATION

Two attempted copulations were witnessed. Near the site of the second nest, a male was observed to mount a female as she sat on a branch fluttering her wings and tail in a begging posture. At the site of the third nest, a female flew from one branch to another with a male in pursuit. She also was fluttering her wings and uttering soft calls. In one instance, the male hovered over her in a 'sparrow-

hawk' fashion as she crouched on the branch. Before contact, she left the branch and flew into the air, seemingly toward him, as Robins do when mating, and then flew off, the male again in pursuit.

TERRITORIAL BEHAVIOR

During the two or three days just prior to egg laying, both adults began to protect a small area immediately surrounding the nest, about three to six feet in diameter, from Chickadees, a Cowbird, and other Siskins. The female would leave the nest to chase any bird venturing that near. During nest building the male had been quite attentive to the female and never left the nesting area for very long periods, and he did not seem to be very closely associated with any of the other Siskins or flocks which fed near the nest tree. After the eggs were laid, he would leave the area for short periods, which became longer as incubation progressed. He frequently returned in company with one of several other Siskins. The female would chase these birds, as would the male, if they came too close to the nest. On several occasions, he flew off with these birds after feeding her on the nest. Other birds would enter the general nesting area and feed with one or both of the mated birds, unmolested.

One of the most unusual occurrences of the entire study happened just prior to egg laying. The first nest was situated about sixty yards from the second nest, and both pairs soon learned the position of the other nest. They began making raids on each other's nest, the pair from nest number one being the more aggressive, visiting nest number two repeatedly. The female would sit on the nest a few minutes and the male would sing from a perch in the tree, then both birds would return to their own nest. They often made quick trips from their own nest to number two and back again. This continued until the eggs were laid in nest number one. Pair number two was never observed to attack pair number one, but whenever pair number two approached nest number one, as they did on occasion, they were immediately driven off. Nest number one was three days ahead of number two, probably explaining the dominance of pair number one.

INCUBATION

The first egg was laid in nest number one on April 18 and the second and final one on the 19th. Both eggs were laid before nine o'clock in the morning. Incubation began upon the laying of the first egg and the young hatched thirteen days later, one day apart. Roberts (1936) reported the incubation period as 13–14 days with Evans as the authority. The danger from freezing of the eggs would

appear to be lessened with incubation beginning upon the laying of the eggs.

Nest number one had two eggs, while each of the other two nests found in 1941 had three eggs. Two to four eggs are commonly laid, with three as the usual complement. Simpson (1912) found five nests with three eggs each and one with two eggs in 1912 and two nests with three eggs each in 1925. Fisher (1883) reported four eggs in the nest at Ossining, as did J. A. Allen (1887) for the nest at Cornwall-on-Hudson. The nest found at Cambridge in 1859 had four eggs, but that found by Park in 1883 at Newton had but two eggs. One of the nests found at Hanover in 1878 had four eggs and the other had three.

During incubation, the female stayed very close to the nest. The longest observed period that the female was off the nest for the entire period of incubation was eight minutes. She was fed by the male during incubation, and this permitted long uninterrupted periods on the nest; in fact, he began feeding her on the nest the day before the first egg was laid and in one instance was observed to feed her while she was off the nest before the eggs were laid.

Feeding followed a definite pattern. The female would utter a low, twittering call whereupon the male would appear, at times from quite a distance, and feed her. Possibly he had called first and she was answering him, but his call, if given first, was never heard. As he approached the nest tree he would give a *spee* call. Frequently, the female would leave the nest after being fed but would return in a few minutes. It was thought that she went for water, although this was not definitely established. She always went in the same direction, which was toward the two most available water supplies.

The female always fluttered her wings excitedly and made little noises while being fed. The male would regurgitate large lumps of sticky yellow food and push them down her throat. Later he was observed to offer her small seeds and buds, one at a time. The feeding process reminded one of a young Cowbird begging and receiving food from a host. The male fed the female approximately once every hour, increasing the number of feedings slightly in the early morning and in the late afternoon. The adults of the flocks were seen to eat large quantities of hemlock seeds from the ground and elm buds from the trees.

The female turned the eggs frequently, increasing this activity as the time approached for them to hatch. It was thought that at times she used only her feet in turning them. The nest was heavily in-

fested with lice and she spent much time in picking them from it and from herself.

HATCHING

Just prior to hatching, the female stood up on the edge of the nest and looked at the eggs a great many times. Hatching occurred early in the morning, before 7:30 A. M., or possibly during the night. There was no sign of the egg shell in the nest, but later a small piece was found under the tree. Feeding of the young began very soon after hatching, possibly within the hour.

BROODING AND REARING THE YOUNG

During the first days after hatching, the female fed the young frequently about every ten to fifteen minutes, but near the end of the period, feedings were spaced about an hour apart. The young were fed by regurgitation. The male continued to feed the female on the nest during the first part of the fledging period and she, in turn, fed the young. He now increased his trips to the nest with food to two every hour, and to three or even four toward evening. She often left the nest after being fed and before feeding the young. The male continued to feed her solely only until the seventh and eighth days; then he began to give food directly to the young ones. After the tenth day, the male was not observed to feed the female and she began to forage for herself and for the young.

The young were never left unprotected for longer than eleven minutes. The usual interval that the female was away from the nest during the first week after hatching was three minutes. Before the female began to help with the feeding of the young, she kept the nest very clean by eating all of the excrement, but after she began to help with the feeding, the outer part of the nest became fouled, because neither of the adults removed the material.

Before the female began to leave the nest for any length of time, the male would return in company with other birds, feed her and leave with them. When both birds began to feed the young, it became very difficult to tell the sexes apart. From their actions, however, it was believed that the male never sat on the nest or paid much attention to it, other than bringing food to the female or to the young. Once, when he appeared and found her absent, he uttered a call and she appeared very promptly.

The young developed their first signs of fear about the sixth day after hatching. During the last four days that the young were in the nest, they became very active and the female spent very little

time brooding them. The young would take turns exercising and stretching their wings or walking about the rim of the nest. They scrambled over each other when an adult would appear with food and often would fall over the side, grasping the outer structure and pulling themselves back again. The day before they left, one was observed to hop out of the nest, go a foot or more toward the trunk of the tree, and then return to the nest, settling down in it. The adults seemed to approach the nest rather deliberately during the last two days, seemingly coaxing the young to such daring feats.

Both of the young left the nest on May 15, fifteen days after the first had hatched. The older one showed a definite dominance over the second. The second one probably left the nest a half day earlier than was to be expected; it hopped out when an observer examined the nest too closely, thinking that both of the young had left. One of the birds was found in the nest tree an hour or so after they had left the nest, being fed by one of the adults. The birds were observed in the vicinity of the nest during the next several weeks and Siskins were about Dr. and Mrs. Lords' feeding shelves and bird baths during all of June and part of July. The young were easily distinguished from the adults, having buffy backs and being not nearly so dark.

COMPARISON WITH THE GOLDFINCH

There is such a similarity in the data collected for the Siskin in this study and that collected by Lawrence H. Walkinshaw (1939) for the Goldfinch, that the statement made in the introduction by Bagg and Eliot must be modified slightly. Although many of the habits of the Siskin may be similar to those of the Redpolls and Crossbills, the breeding habits alone would justify the placement of the Siskin and the Goldfinch in the same genus.

These similarities seem significant: (1) The females of both species did all of the work of building the nest, and were accompanied by the males as they searched for nest materials; (2) nest building required five days in both species; (3) incubation was performed by the females and it required thirteen days in both cases; the males fed the females on the nest during incubation; (4) the females brooded the young; the males fed the females by regurgitation, and they, in turn, fed the young until the latter part of the fledging period; the young were fed by regurgitation; (5) the young left the nest in fifteen days; (6) the rim of the nest became fouled at the end of the nesting period after the females began to help feed the young.

SUMMARY

1. Siskins are sporadic breeders in most of New England. There have been frequent records of nesting but relatively few observations on the habits during nesting.

2. Nesting of Siskins at Hanover, New Hampshire, followed a season in which their population was high, as is usually the case where nesting occurs out of the ordinary breeding range. Four nests, three with eggs, were discovered. Only one nest was successful.

3. The female built the nest and was accompanied by the male on her trips to and from the nest during the five days of nest construction.

4. Incubation required thirteen days. It was done solely by the female and was begun upon the laying of the first egg.

5. The male supplied food to the female on the nest during incubation and for eight days after the young hatched. The female received the food and fed the young by regurgitation during the early part of the fledging period. Both adults fed the young during the last days in the nest.

6. The territory of the pair of Siskins under observation was limited to a small area about the nest with a diameter of three to six feet.

7. The young left the nest on the fifteenth day after hatching, twenty-eight days after incubation began.

8. There is a great similarity between the breeding habits of the Pine Siskin and the American Goldfinch.

BIBLIOGRAPHY

ALLEN, GLOVER M.

1903. A List of the Birds of New Hampshire. Proc. Manchester Inst. Arts and Sc., 4: 136–137.

ALLEN, J. A.

1870. Notes on Some of the Rarer Birds of Massachusetts. Amer. Nat., 2: 582–583.

1887. The Pine Finch (Spinus pinus) Breeding at Cornwall-on-Hudson, New York. Auk, 4: 284–286.

BAGG, AARON CLARK, AND ELIOT, SAMUEL ATKINS, JR.

1937. Birds of the Connecticut Valley in Massachusetts: 726–729. (The Hampshire Book Co., Northampton, Mass.)

BAIRD, S. F., BREWER, T. M., AND RIDGWAY, R.

1874. A History of North American Birds. Land Birds, I: 480–482.

BREWSTER, WILLIAM

1906. Birds of the Cambridge Region, Massachusetts. Mem. Nutt. Orn. Club, 4: 262–264.

FISHER, A. K.

1883. Nesting of Chrysomitris pinus at Sing Sing, N. Y. Bull. Nutt. Orn. Club, 8: 180–181.

EATON, ELON HOWARD

1914. Birds of New York. N. Y. State Mus., Mem., 12: 278–280.

FORBUSH, EDWARD HOWE
1929. Birds of Massachusetts and Other New England States, 3: 29–32. (Mass. State Dept. of Agriculture.)
GRISCOM, LUDLOW
1938. The Birds of Lake Umbagog Region of Maine (compiled from diaries and journals of William Brewster). Bull. Mus. Comp. Zoöl., 66: 534–536.
MERRIAM, C. HART
1878. Breeding of the Pine Linnet in Northern New York. Forest and Stream, 10: 463.
NEW ENGLAND MUSEUM OF NATURAL HISTORY
1941. Bulletin of New England Bird Life, Jan.–June.
ROBERTS, THOMAS S.
1936. Birds of Minnesota, 2: 364–367. (Univ. of Minn. Press.)
SUTTON, GEORGE M.
1928. Birds of Pymatuning Swamp and Conneaut Lake, Crawford County, Pennsylvania. Ann. Carn. Mus., 18: 19–239 (*cf.* p. 174).
SWENK, MYRON H.
1929. The Pine Siskin in Nebraska. Wils. Bull., 41: 77–92.
TODD, W. E. CLYDE
1940. The Birds of Western Pennsylvania: 614–617. (Univ. of Pitts. Press., Pittsburgh, Penna.)
WALKINSHAW, LAWRENCE H.
1939. Life History Studies of the Eastern Goldfinch. Jack Pine Warbler, 17: 19–20.
WRIGHT, HORACE W.
1911. The Birds of the Jefferson Region, in the White Mountains of New Hampshire. Manchester Inst. Arts & Sci., 5 (1): 64.

Dartmouth College,
Hanover, New Hampshire

NOTES ON THE BIRDS OF SOUTHAMPTON ISLAND, BAFFIN ISLAND AND MELVILLE PENINSULA

BY REYNOLD BRAY

(WITH COMMENTS BY T. H. MANNING)

REYNOLD BRAY was drowned on September 14, 1938, when on his fourth visit to Arctic regions. His obituary was written for 'The Auk' by McAtee (Auk, 57: 139–140, 1940). The present summary of the results of Bray's ornithological work while a member of the British Canadian Arctic Expedition between May, 1936, and September, 1937, was originally intended for his own use in further work he had planned for the same regions rather than for publication; but since none of it has previously been published, it is here presented in full and unchanged except for minor editorial corrections.

The Expedition left Churchill by whaleboat on June 3, and travelled north along the west coast of Hudson Bay to Southampton Island. On June 23, Bray was left near the Snow Goose colony at the Bay of God's Mercy. He was picked up again on August 28 on the way to Repulse Bay. We arrived there on October 12, after coasting up the west side of Southampton Island and visiting York Bay and Frozen Strait. On December 21, Bray, accompanied by G. W. Rowley, left for Iglulik by dog team. During that winter he travelled to Piling on the west, and Arctic Bay on the north coast of Baffin Island. He spent the following spring and summer in the region of Fury and Hecla Strait, first at Agu Bay and later at Iglulik and the nearby mainland of Melville Peninsula. In his summary, Bray frequently refers to earlier works dealing with Southampton Island, Melville Peninsula and west Baffin Island. Where known, I have inserted the citations for these references. I have also added some remarks on distribution to bring the paper up to date for the area chiefly discussed. When not otherwise stated, these are from my notes made during the four years (1936–1940) spent in this region, chiefly at Frozen Strait, Seahorse Point, and Taverner Bay.

All such additional notes are in square brackets.

T. H. MANNING

COMMON LOON, *Gavia immer immer* (Brünnich).—In the spring of 1936, a large loon was taken near the Hudson's Bay Company's post at Repulse Bay. I was told that the natives had been very surprised, and had said that they had never heard of such a bird. Parts of the skin were kept for a time, but there was nothing left of it when we reached the post in the fall, so that I have no data to suggest which of the two large loons was represented. The present species is quite common on the north shore of Hudson Strait, and in the Nettilling Lake area in western Baffin Island [Soper, 1928: 76], but on the west side of Hudson Bay it barely straggles north to Churchill. The Yellow-billed Loon, *G. adamsi*, was recorded by J. C. Ross [cf. Sutton, 1932: 13] from Boothia Peninsula, but there are no other records north or east of Baker Lake. [A single specimen was taken at Munk Island by G. W. Rowley in 1939 (Taverner 1941). Between Hantzsch River and Straits Bay Common Loons were fairly numerous, but none were definitely identified north of the latter place, although I thought I heard one at Piling. Neither Sutton (1932: 13) nor I observed any on Southampton Island, but the Eskimos are quite familiar with it, and say it definitely occurs there occasionally. Mr. Bowes, the Canadian Government radio operator at Nottingham

Island in 1938, told me there were three species of loons on that island.—T. H. M.]

RED-THROATED LOON, *Gavia stellata* (Pontoppidan).—I never grew accustomed to the abundance of these loons. On the low limestone marshland east of Crozier River, on Abadyar, Nerdlonaktoq, and Iglulik Islands, and in the less rugged parts of the granite country northwest of Quilliam Creek, Red-throated Loons breed on almost every lake. Only waters so small that a bird in the middle would be almost within shotgun range are commonly unoccupied. They come north fairly early, a pair reaching Iglulik Island on June 3. I first saw newly hatched young at the mouth of Crozier River on July 24. On August 7, a native brought me a young loon not more than 48 hours old. I considered this an exceptionally late date. Of eleven nests within a few miles of the head of Quilliam Creek, only one was on the mainland; the others were built on small grassy islands close to the main shore of the shallow lakes. They were constructed from decomposing vegetable stems, and were invariably so infested by flies and mosquitoes that the eggs seemed to lie in a gray mass of insects. They were the most revolting homes I have ever seen.

In 1936 I found this species abundant on the islands in the mouth of Boas River, not only amongst the geese, but on the small muddy islands at the edge of the open bay where their companions were American Brant and Herring Gulls. As in 1937, the first young hatched on July 24. On August 10 I collected two young birds which were still entirely covered with down, although they had grown to nearly three-quarters the length of their parents. Owing to the absence of standing water, there were no loons breeding on the tundra west of the river as far as the limestone-ridge area, where there were at least two pairs. I last saw loons in 1936 on September 18 at Cape Munn.

Kak-kak-kak-kak-kak, the hoarse laugh of the Red-throated Loon is one of the most notable of the tundra sounds, and generally serves to distinguish this species from the next; the other calls, uttered more often from the water, I never learned to separate, but I have never heard a startled Red-throated Loon squeal on diving, as the Pacific Loons almost always do.

PACIFIC LOON, *Gavia arctica pacifica* (Lawrence).—This is a more locally distributed species than the last, and has not yet been recorded north of Lancaster Sound. It is the common breeding loon at Churchill, but is very rare on the south shore of Hudson Strait. Soper [1928: 77] found it fairly common in southern Baffin Island,

TEXT-FIGURE 1.—Map of region visited by Reynold Bray in 1936–1937.

and Sutton states that it is as numerous as *stellata* in the south-east part of Southampton Island. [Sutton (1932: 14) says that "The Pacific Loon is an abundant and widely distributed summer resident all along the south and south-west shores of Southampton . . ." Speaking of the Red-throated Loon (1932: 18) he says: "Scarcely so common as the Pacific Loon in the region of Coral Inlet and Prairie Point. At Cape Low, however, it was the commoner . . ."—T. H. M.]. In 1936 it was much less common than the smaller species at the Bay of God's Mercy; I found two nests only, both of them on islands in the mouth of Boas River. Eggs in the first nest I found, hatched—one on July 22, the other on July 24.

In the region of Fury and Hecla Strait the proportion of *arctica* to *stellata* appeared to be a little higher than at the Bay of God's Mercy. Of four breeding pairs, one nested between the granite ridges about eight miles south of Fury and Hecla narrows, two on the low limestone tundra east of Crozier River, and one pair used to fish off the southeast point of Iglulik Island through the last half of August. Parry saw a pair on Nerdlonaktoq Island [I cannot find this reference, but Parry (1824: 435) mentions both 'Black and Red-throated Divers' at Arlagnuk.—T. H. M.] and the natives told me the species nests on Iglulik Island. One of the nests near Crozier River contained one egg on July 22, two days before the hatching of the Red-throated Loons on the next pond; there were two when I next visited the nest a week later.

The voice of this loon is particularly varied and weird; one common cry reminded me of the laughing Arctic fox. If surprised, it often gives a very expressive squeal, like an animal in the greatest possible pain, the instant before it dives.

[In general, I think *arctica* is less common than *stellata* on Southampton Island and the north shore of Frozen Strait. In West Baffin Island, between Taverner Bay and Piling, it appeared to be the commoner. Both species are very uncommon on the Great Plain of the Koukdjuak.—T. H. M.]

HOLBOELL'S GREBE, *Colymbus grisegena holboelli* (Reinhardt).—Manning preserved a single specimen which had been obtained by natives from South Bay, Southampton Island, in 1934. This seems to be the only record of the species on or north of Hudson Strait.

ATLANTIC FULMAR, *Fulmarus glacialis glacialis* (Linnaeus).—Probably occurs rarely in the northern part of Foxe Basin. [Hantzsch (Hesse 1915: 145) saw one on October 2, 1910, on the shore of Foxe Basin, presumably near the mouth of the Koukdjuak River.—T. H.M.]

Some of the natives say they have seen birds between Iglulik and Baffin Island, mostly in spring; such individuals may have come through Fury and Hecla Strait. Fulmars are abundant in Admiralty Inlet, and I have a specimen of the light phase from Arctic Bay. Rowley saw immense numbers feeding on the carcase of a narwhal which had been killed by killer whales in the northern part of the Inlet near Strathcona Sound.

I saw none on the waters around Southampton Island in 1936. [Sutton (1932: 24–25) saw one at South Bay, April 26, 1930.—T.H.M.]

WHISTLING SWAN, *Cygnus columbianus* (Ord).—Very uncommon in the northern part of Foxe Basin. I heard of only one which had been shot a few years ago on Iglulik Island. Richardson (1825: 240) mentions a specimen collected at Iglulik Island on June 19, 1823, by Parry's expedition. Amongst the natives from Repulse Bay to Cockburn Land, Southampton Island is renowned for its swans and geese. Baird and Rowley found swans numerous on Coats Island in the fall of 1936.

A pair of swans nested about six miles west of the mouth of Boas River not far from the edge of the goose territory, and two more pairs on islands in the rather deep lakes amongst the limestone ridges. One of these islands, not more than fifty yards long, was also occupied by a small colony of Arctic Terns. On September 16, on the west coast of Southampton about half way between Cape Kendall and Cape Munn, I found a pair of swans with three flightless young. Both the old birds rose while still a long way out of range, and though they circled for a time, when I began to chase the young they soon flew off and did not return. I never saw Snow Geese or Brant behave thus indifferently. I believe swans occur occasionally in northern Baffin Island, possibly breeding near Pond Inlet and on Bylot Island [cf. Soper, 1928: 95] but I have no wholly satisfactory evidence.

[We saw no swans along the shores of Foxe Basin or Foxe Channel, but the Eskimos say they sometimes occur in northwest Foxe Peninsula. An Eskimo saw two flying over Repulse Bay Post in the spring of 1937. We saw none while at Frozen Strait, but Parry (1824: 240) records a nest on Winter Island.—T. H. M.]

HUTCHINS'S GOOSE, *Branta canadensis hutchinsi* (Richardson), (Iglulik name, 'Kangoq').

AMERICAN BRANT, *Branta bernicla hrota* (Müller), (Iglulik name, 'Nerdleq').

LESSER SNOW GOOSE, *Chen h. hyperborea* (Pallas), (Iglulik name, 'Kangoq').

BLUE GOOSE, *Chen caerulescens* (Linnaeus), (Iglulik name, 'Kangoviq').—Geese are very uncommon on the east coast of Melville Peninsula, at least from Repulse Bay as far as Fury and Hecla Strait, and along the north shore of Foxe Basin. The Iglulik natives do not know of any breeding colonies in this area, although they say that 'nerdleq' (which seems to denote any dark goose) visit Nerdlanaktoq in rather large numbers in spring [cf. Parry, 1824: 435). Capt. G. F. Lyon found Snow Geese and Brant numerous at the mouth of Crozier River in July; [according to Parry (1824: 461), Lyon saw 17 geese and one nest was found.—T. H. M.] also on Nerdlanaktoq. Between June 12 and August 6, at the mouth of the same river, I saw geese only once, on June 18, when two Brant alighted on a pool near camp; they left the same day, and I never saw them again. On August 5, when the natives picked me up at my summer camp, they told me that Pjugatuk, the best hunter from Iglulik, had seen great numbers of 'nerdleq' on Nerdlanaktoq Island in June. Nevertheless, there were none when I reached the island myself on August 12, although it looked a very favorable goose country. This suggests that geese have become less plentiful in the district during the past hundred years. As far as I know, there is now only one large breeding ground of Snow Geese within the present territory of the Iglulik natives; on Satorrssuaq [Baird Peninsula] and the neighboring Sadleq Island [Bray Island] in Piling region. And, judging from old ruined stone corrals, the people say that here, too, the birds must formerly have been more widely distributed. Rowley found Snow Geese breeding in small numbers at the head of Strathcona Sound, in the northeastern part of Admiralty Inlet; I have two specimens which appear to be ordinary *hyperborea*. This is the most northeasterly point from which the race has been reported; examples from Dundas Harbor on Devon Island, from Eclipse Sound, and from Bylot Island, represent *atlantica*. [Cf. Taverner 1935: 116.] The situation of the big goose colony at the mouth of Boas River, Bay of God's Mercy, Southampton Island, seems to resemble rather closely that described by Soper on Bowman Bay, but the proportion of Blue to Snow Geese is roughly reversed, Snow Geese being at least fifteen times as numerous as Blue Geese. I recorded only two nests of pure Blue Geese, six of Blue Geese paired with Snow Geese, two of Hutchins's Geese, eleven of Brant, and more than a hundred Snow Geese. I verified that four of the mixed pairs consisted of male Blue Geese mated with female Snow Geese. Egg laying was over when I reached the breeding ground at the end of June, so that I have no data on incubation. Dates of hatching were re-

markably uniform, as follows: Blue and Snow Geese, July 16–18; Hutchins's Geese, July 21; Brant Geese, July 23, 24.

Only two clutches of Snow Geese eggs remained unhatched after July 20. On that day the Blue and Snow Geese, accompanied by their tiny young, left their nesting islands and began to walk inland up the river. When I first realized this general movement, the rear-guard already had a start of several miles, and I never properly caught up with the main body. In the evening, I gave up the chase, and returned to my camp in order to preserve the specimens I had already collected. I did not see the geese again until large flocks, probably of non-breeding adults, appeared on the coast in August. I do not know the purpose of this migration; the islands where the majority of the geese nest are covered with an unusually luxuriant growth of grasses, and the birds are remarkably free from enemies while in the region. Throughout my stay on the north shore of the Bay of God's Mercy, I saw foxes on only two occasions, first on June 30, several miles outside the western border of the goose territory, and again on August 28, at the mouth of the river. Manning saw a single owl on August 27 and the region is far from the range of Duck Hawk and Gyrfalcon. This leaves the jaegers, which are not numerous. One pair of Long-tailed Jaegers and four Parasitic Jaegers nested within ten miles of the center of the goose colony.

The Brants nested below the territory of the other geese on the small islands which, at low tide, rose a few feet above a maze of mud flats and shallow channels of fresh water. Herring Gulls, King Eiders, and a few Red-throated Loons shared this territory with the Brants. Within two days of the hatching of the young, the Brants disappeared in their turn, although I never saw them leave, and after July 26, I did not find them until August 20 when I saw four adults and nine young amongst islands near the east bank of the river. I chased them for a long time, until the old birds flew off, and with some difficulty I at length caught two of the young. If they had kept to the land, I might never have caught up with them, but they took to the water whenever they could, and I was able to wade much faster than they could swim. The territory of the Brants extended for several miles each side of the mouth of the river, but I found none breeding inland of the area of tidal mud. Thus the range of the Snow Geese scarcely overlapped that of the Brants.

I found only two nests of Hutchins's Geese, one amongst the Snow Geese, about a mile behind the high-tide mark, and the other, with six eggs, on one of the outer islets close to three nests of King Eiders.

[Besides the Blue and Snow Goose colony at the Bay of God's Mercy, scattered nests of these four species occur in other suitable locations on Southampton Island, as do those of *Branta canadensis leucopareia.* Sutton (1932: 30–31) concluded, chiefly from Eskimo testimony, that *B. c. canadensis* also occasionally nests on the island.—T. H. M.]

WHITE-FRONTED GOOSE, *Anser albifrons albifrons* (Scopoli).—There seems to be no positive evidence of the occurrence of this species anywhere in the area or on the west coast of Hudson Bay, or on the main Arctic coast east of Coronation Gulf. [Cf. Taverner, 1935: 117.]

AMERICAN PINTAIL, *Dafila acuta tzitzihoa* (Vieillot).—On the west coast of Hudson Bay there is no certain record north of Chesterfield.

[I collected specimens near Seahorse Point, Southampton Island, on June 8 and 26, 1938. Five were seen altogether. A flock of 15–30 were seen by Eskimos near Native Point several times during June of that year. In July, 1940, I frequently saw two to five at a small lake near the coast about 15 miles north of the Koukdjuak River. Taverner (1935: 117) says that a specimen has been taken at Cape Alberta (by J. D. Soper), on the north side of Foxe Peninsula. —T. H. M.]

NORTHERN EIDER, *Somateria mollissima borealis* (Brehm), (Iglulik name, 'Miteq').—The most notable breeding ground of the Northern Eider in northwest Foxe Basin seems to be Sioraq (Parry's Tern Island). I did not visit the island in the summer, but Father Bazin and the natives were often talking about it. Parry [1824: 282–283] visited it on July 27, and found a great many eider's eggs as well as a heap of shells left by the Eskimos. He named it from the abundance of terns. It lies between Iglulik and Jens Munk Island. Eiders are said also to be very numerous on Ugli and Uglerglakdjuk (Parry's North and South Ooglit Islands). At any rate, the species seems to be confined to the outlying island, beyond the reach of foxes, and I found no trace of it on Iglulik, Nerdlernaktoq, Abadyar, or Qiqektalu [between Abadyar and the mainland] islands nor the islands in Hooper Inlet, nor anywhere on the mainland, although King Eiders are common at all these places. The natives confirm this.

I never saw this species on the north shore of the Bay of God's Mercy. [I saw a few there in July, 1934.—T. H. M.] A number nested on islands in a lake inland from Gibbons Point about eighteen miles from the head of the bay on the east shore. They shared the islands with Herring Gulls and terns. King Eiders were abundant along the north shore of the bay, and were also much more numerous than Northern Eiders at the edge of the land floe, and in the pack

in the north part of Hudson Bay and Roe's Welcome, June, 1936. *S. m. borealis* and *dresseri* should intergrade in the region.

[Eiders are said to remain as far north as Cape Fullerton throughout the winter. In 1940 they were still numerous when we left on December 20, and I saw large numbers there in early March, 1937. All identified at Cape Fullerton after October 20 were of this species, and probably "*sedentaria*" (Snyder 1941) though specimens collected have not yet been identified subspecifically. Both species nest on the islands in Frozen Strait, but are scarce along the bold northeast coast of Southampton Island. King Eiders are by far the more numerous breeding eiders at Taverner Bay. The Northern Eiders probably do not nest on the Great Plain of the Koukdjuak, although a few do at the north end of Taverner Bay.—T. H. M.]

KING EIDER, *Somateria spectabilis* (Linnaeus), (Iglulik name, 'Miteq').—This is an abundant breeder in the northeast of Melville Peninsula, especially at the mouth of Crozier River, where it nests on the grassy banks of the pools. I never found a nest away from the immediate neighborhood of water, nor more than three miles from salt water. It seemed to prefer lower, more swampy country than the Old Squaws, and I have never found nests of both at the same pond. I saw large flocks of males in the southern part of Admiralty Inlet, from May 16 onward, but I believe the species never winters in the northern part of Foxe Basin. [No eiders were seen at the floe near Hantzsch River between October 7, 1938, and April 17, 1939.—T. H. M.] On Southampton Island I found King Eiders nesting along about twenty miles of swampy coast on the north shore of the Bay of God's Mercy. Nests were either just above high tide (the favorite territory of the Sabine's Gulls), or on the islands amongst the tidal flats. About twelve miles west of the river, where the tundra, though still very low and covered with a good growth of grasses, was beyond the influence of the early summer floods, the territory of the King Eiders ceased abruptly. Nor did I see any on the east coast of the bay in the Gibbons Point region where the coast is formed of rather high beaches of broken limestone.

This is all very different from the circumstances noted by Sutton (1932: 77): "They [the King Eiders] nest, not on the off-shore islands in the larger lakes, as does the Northern Eider, but in the middle of the tundra, often far from a lake, and only infrequently near any sort of body of water."

For some time after the eggs are laid, the males remain with the females in the neighborhood of the nests, but early in July they dis-

appear, presumably going out to sea. On Southampton Island I saw the last males on July 10, about forty, very wild and without ducks, at the head of the Bay of God's Mercy. At Crozier River, in 1937, I saw no males after July 2. On Southampton Island, the first eggs hatched on July 26; at Crozier River, on July 21. I did not see any eiders on the south shore of Fury and Hecla narrows.

I noticed a great difference between the behavior of newly hatched eiders and geese of the same age. The ducks were extremely lively a few hours after hatching, and were even quite difficult to collect at all; whereas the young of all the geese, as if, in their silky down, they knew that they were the aristocrats of their family, seemed to require almost constant attention from their parents throughout the first day of their lives. When captured they would lie quite still, only piping feebly, and they never tried to escape when I took them into my tent; but a brood of young ducks less than a day old, which I had carried home in a rucksack, climbed out of it and escaped from the island altogether while I was taking off my boots.

RED-BREASTED MERGANSER, *Mergus serrator* Linnaeus.—Some of the Iglulik natives know this species from the Chesterfield area, but I have no evidence that it occurs farther north, although Soper [1928: 87] found it fairly numerous in southern Baffin Island.

[Birds probably belonging to this species were seen by Eskimos at Ranger Brook, Southampton Island, in August, 1934.—T. H. M.]

OLD SQUAW, *Clangula hyemalis* (Linnaeus), (Iglulik name, 'Aggiuk').—An abundant breeder on all the lands surrounding Foxe Basin, except perhaps the lowest alluvial marsh regions. It has none of the dependence upon the sea which the King Eider seems to show, and as far as I ever walked into the interior of Melville Peninsula west of Crozier River, there were few lakes which did not possess a pair. On the high country north of the inlet and on the limestone tundra it was less numerous. I first noted it in large numbers when I returned to Foxe Basin from Admiralty Inlet at the beginning of June. There were immense flocks at the edge of the floe off the southeast point of Iglulik, and on my trip in to my summer camp at the mouth of Crozier River we saw innumerable pairs courting on the pools of fresh water which covered the ice. On Southampton Island I never saw an example of this species within the area subject to the spring floods, although it was common on the pools of the limestone-plateau area behind the east shore of the bay. West of the river I found only two pairs, both on the deep permanent lakes amongst the first ridges, well out of reach of the flood water. It is

probably one of the very few birds which inhabit the far interior of the northern islands and of Melville Peninsula.

[Old Squaws were abundant on the sea and lakes at Frozen Strait and Seahorse Point, but few were seen along the bold parts of the northeast coast of Southampton Island. In 1940 they were numerous during the breeding season along the east coast of Foxe Basin between Koukdjuak River and Taverner Bay, but I doubt if any birds nested south of the ridges.—T. H. M.]

AMERICAN ROUGH-LEGGED HAWK, *Buteo lagopus s.johannis* (Gmelin). —On October 7, on the mainland between Gore Bay and Repulse Bay, while we were sledging into the post for the first time, one of these birds flew low over our heads. This summer (1937) about three breeding pairs were obtained by Manning from the shores of Frozen Strait. Baird found a nest on the limestone screes of the West Nuvudlik [The Points], about twelve miles inland from the head of the Bay of God's Mercy, July 8, 1936.

[They were rather numerous at Frozen Strait, but less common along the Foxe Channel coast of Southampton Island. Six were seen in May, 1938, at Seahorse Point, but none later. A single bird was seen flying at Taverner Bay on June 8, 1940.—T. H. M.]

WHITE GYRFALCON, *Falco rusticolus candicans* Gmelin.—I have evidence of only two nestings. One on the north shore of Adams Sound, Admiralty Inlet, where I saw the nest and collected one adult on May 9; the other on the cliffs of Qiquektalu, between Abadyar Island and the mainland. I never visited this site, but Father Bazin told me he used to see the birds every year. It must be very close to the big colony of Herring Gulls near the west side of Abadyar. The birds I saw in Adams Sound were extremely pale (white) examples, and the Abadyar ones are said to be much the same.

Fathers Cartier and Fafard, of Wakeham Bay, on the south shore of Hudson Strait, told me that they ate about eighteen gyrfalcon eggs, taken from four nests (they found five but one was inaccessible), all within ten miles of the post, in May, 1937. All the birds are said to have been very dark. I saw one dark bird at the head of Wakeham Bay on September 18.

[One breeding pair was seen by P. M. Bennett in 1938 on Bushnan Island. I saw an occasional migrant or wanderer at Southampton Island and northeast Foxe Basin.—T. H. M.]

DUCK HAWK, *Falco peregrinus anatum* Bonaparte, (Iglulik name, 'Kaijuk').—Rather common in northwest Foxe Basin. I saw nesting birds on Abadyar Island on June 5; on the north shore of Quilliam

Creek on June 11; and south shore of Fury and Hecla narrows on June 30. I saw no falcons while I was near the goose colony at the Bay of God's Mercy.

[Duck Hawks nest along the Foxe Channel coast of Southampton Island, and near Seahorse Point; they also nest, but less commonly, on both sides of Frozen Strait. One breeding pair was collected from Piling in 1940. Only two or three others were seen on the west side of Foxe Basin.—T. H. M.]

"WHITE-SHAFTED PTARMIGAN, *Lagopus lagopus leucopterus* Taverner," (Iglulik name, 'Akkigiq').—The year 1937 was a poor one for ptarmigan. On my way back to Iglulik from Arctic Bay, Willow Ptarmigan were abundant in the southern part of Admiralty Inlet and on the land crossing from Admiralty Inlet to Gifford Fjord during the last week of May. All specimens obtained had white primary shafts; I have no evidence as to the breeding of this race on Melville Peninsula.

[Some White-shafted Ptarmigan remained all winter at Taverner Bay, 1939–40. They were plentiful there the following spring, and some probably nested. I saw none at Hantzsch River or to the north of there. I identified none among the large flocks of Rock Ptarmigan on the north side of Frozen Strait in the spring of 1937 or in the fall of 1940. In some winters they are rather common on Southampton Island. I have not seen them there during the summer, but Sutton (1932: 88–90) considers they nest among the willows in the South Bay region.—T. H. M.]

KELLOGG'S PTARMIGAN, *Lagopus rupestris kelloggae* Grinnell, (Iglulik name, 'Akkigiq').—Ptarmigan do not nest on the low limestone islands of northwest Foxe Basin (Iglulik, Nerdlernaktoq), and the natives say they do not occur in the limestone-fragment area in northeast Melville Peninsula. This suggests that Willow Ptarmigan are not common on Melville. During the summer I saw only two ptarmigan, presumably of this species, on the high hills (about 700 feet) northwest of Quilliam Creek, although I wasted a good many days examining this bleak region. A large flock reached Abadyar Island on September 14, when they were seen by natives; but the mission schooner arrived at Iglulik on the same day, so that I never had a chance to hunt them.

They were rarely seen in winter. There was a small flock on March 9 on the ice south of Munk Island, and another on April 28, near the head of Admiralty Inlet. Manning has sent home a number of Rock Ptarmigan from Frozen Strait. Only one of these, a

female from Polecat Harbor, June 8, is sufficiently advanced in the brown plumage to be identified certainly as *kelloggae*. The locality is near the probable border of *kelloggae* and *rupestris*, and the date is too early for one to be sure that the bird was not on its way to a nesting ground still farther north.

[Rock Ptarmigan were very plentiful in 1937 during the spring migration on the north side of Frozen Strait, and on September 26, 1940, a flock of 1,000 was seen there as well as many smaller ones. Some nest near Seahorse Point, and one breeding female was collected there. No ptarmigan were seen in August, 1938, on the northeast coast of Southampton Island between Cape Welsford and East Bay, but in 1934 I saw two families that must have been bred inland from there. During the first half of August, 1938, they were numerous on northwest Foxe Peninsula. A few were seen in the summer at the north end of Taverner Bay, and in August, 1940, between there and Piling. They were fairly common at Taverner Bay and Hantzsch River during migration. Taverner has referred my specimens taken on the east side of Foxe Basin to *L. r. rupestris*.—T. H. M.]

LITTLE BROWN CRANE, *Grus canadensis canadensis* (Linnaeus), (Iglulik name, 'Tattigak').—I saw no cranes in 1937, but the Old Queen [an Eskimo] saw one on Iglulik Island in June. Natives say that cranes used to breed on Iglulik, but no longer do so, though they may still on Nerdlernaktoq. The well-known breeding ground of cranes in northern Foxe Basin is in the Kangerkslukjuak [Steensby Inlet] region, and near Piling. [I saw no cranes around this coast. —T. H. M.] G. F. Lyon [Richardson, 1825: 353] shot a crane near the mouth of Crozier River on June 25, 1823. The species ranges northward, though not very commonly, at least to western Bylot Island and Pond Inlet region. [P. D. Baird (1940: 227) saw one on Bylot Island in 1939; M'Clintock (1860: 137) saw a pair there in 1858.—T. H. M.] Father Bazin gave me a photograph of one he had shot near Pond Inlet.

I saw only one crane in 1936, on the coast six miles west of the mouth of Boas River, June 22, and I heard several on the Roe's Welcome shore, about half way between Cape Kendall and Cape Munn, on September 8.

[They may occur anywhere on the limestone or marshy regions of Southampton Island. On June 14, 1937, I saw a pair flying over the north side of Frozen Strait. Rae (1850: 159) saw eight cranes flying north near Garry Bay in 1847.—T. H. M.]

EUROPEAN RINGED PLOVER, *Charadrius h. hiaticula* Linnaeus, (Iglulik name, 'Kudlikudliakdjuk').—I have one specimen from Arctic Bay, dated June 8, a very early date for a species which must have migrated via Iceland and Greenland from Europe. The species has otherwise been recorded only from Pond Inlet [Soper, 1928: 103], and Clyde River, northeast Baffin Island. It appears to be a common breeder in the northeastern part of Admiralty Inlet.

[Hantzsch (Hesse, 1915: 169) obtained a specimen from Cumberland Sound. Kumlien (1879: 83) regarded it as commoner in Cumberland Sound than the Semipalmated Plover, but Soper (1928: 103) did not record it there, though he took many specimens of the latter species.—T. H. M.]

SEMIPALMATED PLOVER, *Charadrius semipalmatus* Bonaparte, (Iglulik name, 'Kudlikudliakdjuk').—On the limestone beaches of the south shore of Quilliam Creek and at the mouth of Crozier River, on the granite as well as on the limestone shores, this is the commonest of the breeding birds. I collected specimens also from the unpromising rugged shore of Fury and Hecla narrows, and from Abadyar Island. I never saw it on Iglulik Island, but natives say that it is abundant on the disintegrating limestone beaches south of Hooper Inlet.

I first saw the species when on my way in to the head of Quilliam Creek on June 12, when they seemed to be mated. On the evening of June 30, I found a nest with two eggs; two more were laid on consecutive days, and three of them hatched in the early morning of July 26, or rather more than twenty-three days after the fourth egg had been laid. I first collected young less than twenty-four hours old, on July 13. All the nests I found were on the bare limestone beaches near high tide mark, and were not decorated in any way. Occasionally I used to see birds feeding in the meadows between the ridges on the granite side of Crozier River up to a mile from the sea; but they kept, for the most part, to the beaches, and though they used to follow me noisily on my walks up the river, I never saw one more than two miles from the mouth.

The young at first are very helpless, and cannot live long without constant brooding; nevertheless, on some occasions they may leave the 'nest' almost as soon as they are all dry, and stumble as far as several hundred yards until the mother thinks it safe to brood them. During my first stay on Abadyar, in August, I found one family with fully-fledged young on August 8. I noted no increase in numbers due to migrants from the north, and after leaving Abadyar on August

12, saw only one more bird, a young male brought in by a native on September 11.

I do not know how far north the range of this species extends or whether it overlaps the territory of *hiaticula,* but, since it breeds on the south shore of Fury and Hecla Strait in its narrowest part, it will almost certainly be found on the much more favorable country round Gifford Fjord and in the low limestone country between Agu and Bernier Bay.

I saw no Semipalmated Plovers while at the Bay of God's Mercy, and indeed did not expect the species on the mud flats and flooded marshes; but I noted a single individual on the gravel beach at Cape Kendall on September 6.

[Semipalmated Plovers are the most abundant birds on the gravelly beaches near Seahorse Point, but elsewhere on Southampton Island they are not particularly common. They are fairly numerous at Frozen Strait and on the coast of Baffin Island from Cape Dorset to Wordie Bay (excluding the Great Plain of the Koukdjuak). We saw none north of Wordie Bay.—T. H. M.]

AMERICAN GOLDEN PLOVER, *Pluvialis dominica dominica* (Müller), (Iglulik name, 'Tudliakdjuk').—I believe this species is exceedingly uncommon in northwest Foxe Basin; I did not see a single individual during spring, summer or fall, although I took great care to identify the Black-bellied Plovers which were rather common, especially during migration. The Iglulik natives do not distinguish this species. I found no Golden Plovers breeding in the marshes at the Bay of God's Mercy, but they were numerous on migration after August 1.

[A few scattered pairs probably nest in suitable places throughout Southampton Island. None were seen on the northeast coast or at Frozen Strait. Eight Golden Plovers were seen and two were collected at Taverner Bay on August 10, 1939. The only other Golden Plover identified on the shores of Foxe Basin was a single juvenile collected at Jenness Brook on August 11, 1940. Hantzsch (Hesse, 1915: 167) says that the Golden Plover was the characteristic bird of the tundras to the southwest of Lake Nettilling, but Soper (1928: 101–102) saw only two in the Nettilling Lake area. On August 25, 1938, I saw several hundred plovers near the mouth of Koukdjuak River, but they were not identified specifically, and it is most probable that they belonged to the following species.—T. H. M.]

BLACK-BELLIED PLOVER, *Squatarola squatarola* (Linnaeus), (Iglulik name, 'Tudliakdjuk').—Fairly common in northwest Foxe Basin area, although I have no positive evidence of nesting. On June 8, 1 saw

two birds on Iglulik Island. On June 18, a flock of nine visited the mud flats at the mouth of Crozier River, and I collected three specimens, the sexual organs not much enlarged. On July 2, I saw and collected a solitary female from Fury and Hecla narrows; I twice saw birds in July on the dry limestone tundra east of the river. On August 12, I saw a bird on Nerdlernaktoq Island. Young birds were fairly common amongst the migrating flocks on the east coast of Iglulik. From August 20 until I moved to Abadyar on the 31st, I saw at least one every day, though never more than five together. The natives say that the species nests on Iglulik Island. I saw only one individual at the Bay of God's Mercy, near the mouth of the river, July 24, 1936.

[A few were regularly seen at the head of the Bay of God's Mercy throughout the summer of 1934, and some nest at other places on the marshy coast of Southampton Island. None were seen on the northeast coast of the island or at Frozen Strait. Black-bellied Plovers nested fairly commonly at Taverner Bay and I observed a few nesting birds on the west coast of Foxe Peninsula. Only two birds were seen on the flat land between Taverner Bay and the Koukdjuak River during the 1940 nesting season. A few probably nest in any suitable marshes north of Hantzsch River. I saw some on Baird Peninsula and Bray Island towards the end of August.—T. H. M.]

RUDDY TURNSTONE, *Arenaria interpres morinella* (Linnaeus).—I have no evidence of breeding in the northwest Foxe Basin area. During my stay on the mainland, I never saw a Turnstone, and there were none on Abadyar Island from August 8 to 12, but they became numerous on the east coast of Iglulik on August 16, and remained common until I left on August 31. I collected seven specimens, all of them juveniles. I saw none on Abadyar from September 1 to 14.

I think there were three pairs nesting in the grassy tundra west of Boas River, but I never found a nest, and collected only one young bird, still flightless, on the late date, August 16. There were a few Turnstones around high-water mark throughout the summer, but they became much commoner during the fall migration. Around August 16, some very large flocks (above 100 birds) rested behind an isolated rocky point about ten miles west of the mouth of the river, where they were associated with White-rumped and Red-backed Sandpipers, Red Phalaropes, and Knots. On Iglulik, their particular companions were Purple Sandpipers.

[On some of the limestone areas of Southampton Island, Ruddy Turnstones are a very common nesting bird. None were seen on the

northeast coast of the island or at Frozen Strait. They nest quite commonly at Taverner Bay, but are scarce to the northward and southward of it.—T. H. M.]

HUDSONIAN CURLEW, *Phaeopus hudsonicus* (Latham).—The Iglulik natives do not know this species, and did not recognize a picture of it. One specimen was obtained by Bernier from Arctic Bay. A flock of about fourteen frequented the marshes at the head of the Bay of God's Mercy throughout July, 1936. Manning had seen them in the same place two years before. I saw one bird on the tidal flats about six miles west of the mouth of Boas River, on August 4.

[Several Hudsonian Curlews were seen at Ranger Brook between July 21 and July 25, 1936, and a single specimen was collected near Leyson Point on July 16, 1938. None were seen elsewhere, and I know no record for Baffin Island except that given above (cf. Taverner, 1934: 122).—T. H. M.]

AMERICAN KNOT, *Calidris canutus rufus* (Wilson).—We have a few summer specimens from the Bay of God's Mercy, and Manning collected a young bird from the east side of the bay in 1934, which must have been bred there; but I believe this is unusual. I collected one specimen in full winter plumage on August 12, at the mouth of the river. Around August 18, quite large flocks appeared on the shore.

I found no trace of the species, either as breeder or migrant, in 1937, and I got no definite information from the Iglulik natives, although a few believe they may have seen individuals in the fall.

[In 1936, I saw a few Knots inland on the rather bare limestone ridges northwest of the Bay of God's Mercy; I think they nest there. I saw two Knots near Leyson Point, Seahorse Point, and Cape Dorchester; none elsewhere.—T. H. M.]

PURPLE SANDPIPER, *Arquatella maritima* (Brünnich).—On June 9, 1937, I saw a single bird on Iglulik Island, and the same day collected three from Ugliakdjuk in Hooper Inlet. Throughout the summer I looked for the species in vain, although I had particularly hoped to find it breeding on the rugged shore of Fury and Hecla narrows. Accompanied by Turnstones, Purple Sandpipers became very common on the east coast of Iglulik on August 17, and continued to pass until I left at the end of the month. I collected one old bird on August 20; seven others collected, and almost all seen, were juveniles. They were the tamest birds I have ever seen in the Arctic except perhaps the young Snow Buntings. Their whistle reminds me a little of that of the White-rumped Sandpipers, but it is much louder,

and rather wheezy. I did not see any Purple Sandpipers on Abadyar in September, but one was brought to me there by a native on September 11. I saw a single bird at Cape Munn on September 18, 1936, but none on the unsuitable shores of the Bay of God's Mercy.

[Sutton (1932: 124–126) noted it in migration on Southampton Island, and suggests that it probably nested on the northeast coast; but I saw none there, at Frozen Strait or Seahorse Point. Purple Sandpipers were common during the fall migration at Taverner Bay. They were very numerous at the Bird Islands and nearby mainland on August 1–2, and no doubt nest there.—T. H. M.]

PECTORAL SANDPIPER, *Pisobia melanotos* (Vieillot).—I collected one from a pair which had been feeding at the tide line on the evening of July 11, 1936, about six miles west of the mouth of Boas River. This specimen was in full breeding plumage. Around August 20, I used to see single individuals quite often amongst the flocks of White-rumped, Red-backed, and Semipalmated Sandpipers on the shore; but the species was never numerous until September 8, when it even made up a majority of the mixed flocks of Pectoral, White-rumped and Red-backed Sandpipers and Red Phalaropes on the shore of Roe's Welcome, about half-way between Cape Kendall and Cape Munn. On September 9, I counted bands of 23, 11, and 18 in the same place. I have no evidence of their occurrence anywhere north of Southampton Island.

[Sutton (1932: 126–128) noted the Pectoral Sandpiper in migration and nesting at South Bay. A single specimen was collected at Taverner Bay on August 20, 1939. It has not otherwise been recorded from Baffin Island.—T. H. M.]

WHITE-RUMPED SANDPIPER, *Pisobia fuscicollis* (Vieillot), (Iglulik name, 'Sikdjeriak').—In 1937, I did not observe this species until July 14, near the rapids of Crozier River. Then I collected a set of four young about twelve hours old on the night of July 18–19, and a second set in almost exactly the same place on the night of July 20–21. I think there was a third nest near, but I never found it. On July 24, about six White-rumped Sandpipers appeared near camp, and two that were shot proved to be juveniles. By the end of the month the species had become very common. Small parties, almost entirely juveniles, crowded the tidal pools near the mouth of the river, especially on the granite side.

During my short stay on Abadyar Island in August I saw no White-rumped Sandpipers, but they were extremely abundant on Iglulik Island, at least from August 13, when I arrived, until the end of the

month when I went back to Abadyar Island. The numberless shallow pools which lie in the hollows between the shore ridges swarmed with young White-rumped Sandpipers and Red Phalaropes, and these two made up the great bulk of the mixed flocks which were passing along the east coast of the island throughout August. Since I never visited Iglulik Island in July, I cannot say whether this species breeds on the island, and beyond the three pairs near camp, I never observed it during the nesting season, although I was always on the lookout for White-rumped Sandpipers amongst the nesting Baird's which were so common everywhere.

I have no good evidence of nesting in the Bay of God's Mercy region, although a few birds were present throughout the summer and noted near the head of the bay on June 8; a pair was collected near camp on July 12. About July 31 they became exceedingly abundant, keeping up a majority amongst the flocks of migrating shore-birds which fed on the mud flats in front of my camp until I left on August 30. But they were never as numerous there as during the fall migration on Iglulik Island.

[White-rumped Sandpipers are the commonest nesting sandpiper in the Seahorse Point region. They were an abundant migrant at East Bay in September, 1937, but I identified none along the coast to the north of there or at Frozen Strait. They nest quite commonly at Taverner Bay, but not near the coast on the flat land to the south. They were numerous on the west coast of Foxe Peninsula.—T. H. M.]

BAIRD'S SANDPIPER, *Pisobia bairdi* (Coues), (Iglulik name, 'Sikdjeriak').—I never saw this species on Southampton Island, and it is probably very scarce in the southern part of the island. Sutton obtained a few specimens near Coral Harbour. There are no records from the adjacent mainland coast. Manning has sent out a number of skins from Frozen Strait, but so far there are insufficient data to determine the status of the species in that locality.

In Quilliam Creek and Crozier River regions, on the south shore of Fury and Hecla narrows, and for as great a distance as I ever walked into the interior of Melville Peninsula from the head of the creek, this species is second in numbers only to the longspurs. In fact, it is even more widely distributed, nesting not only on the limestone marshes and the low granite country near the river, but also on the high, desiccated limestone plateau and at 800 feet on the bleak hills overlooking the narrows, where even the longspurs have scarcely penetrated. It seems to like water near its nesting site, but does not mind if the supply has dried up by mid-July. I first heard the

bird on a misty day at Abadyar Island on June 7, and first collected it on the south shore of Quilliam Creek on June 12, but it was already common when I reached the head of the creek on June 14. Throughout the nesting season the trill of the Baird's Sandpipers was the most characteristic sound of the tundra. They are very noisy birds, one female calling constantly even while brooding her young. In this the bird shows a remarkable difference from the behavior of the White-rumped Sandpiper.

I took a set of four young about 24 hours old on July 11, and two more sets, very recently hatched, on the night of July 21–22. The latter represents a more typical date. The species seems to show a slight tendency to a colonial habit; I found two nests very close together, at a place where there were six pairs of excited parents flying around. I took one young bird about 3 days old on July 11, and another almost certainly from the same clutch, fully fledged and able to fly freely, on July 18.

During fall migration time, there was no apparent increase in numbers due to new arrivals from the north (in contrast to the White-rumped Sandpipers). On Abadyar Island, from August 8 to 12, I saw only three sandpipers, all of them of this species. On Iglulik Island, from August 13 to 31, I never observed this species, although there were many thousands of White-rumped Sandpipers and phalaropes, and considerable flocks of Purple Sandpipers and Turnstones.

[In the fall, Baird's Sandpipers were numerous in flocks mixed with White-rumped Sandpipers at Taverner Bay. A number of flocks in which no White-rumped Sandpipers were identified, were seen on the north side of Foxe Basin in late August, 1940.—T. H. M.]

LEAST SANDPIPER, *Pisobia minutilla* (Vieillot).—There are no records of this species from north of the tree line, either east or west of Hudson Bay, with the exception of Kumlien's (1879: 86) which were almost certainly due to confusion with the Semipalmated Sandpiper.

RED-BACKED SANDPIPER, *Pelidna alpina sakhalina* (Vieillot).—I have no good evidence of the nesting of this species at the Bay of God's Mercy, though a few birds were present throughout the season. The first migrants appeared on August 3, and from that date they remained numerous on the mud flats and tidal pools until the end of the month. Around August 18, I saw flocks of more than a hundred nesting amongst the ridges west of my camp. I never noted the species in the Iglulik region, and none of the natives there recognized the picture of it. This is odd. Hennessey obtained it on Melville Island. [Not mentioned in his report on the birds, 1910: 502–508. —T. H. M.]

[We saw no Red-backed Sandpipers at Frozen Strait, Seahorse Point, or anywhere on the coast of Foxe Basin.—T. H. M.]

SEMIPALMATED SANDPIPER, *Ereunetes pusillus* (Linnaeus).—An abundant breeder on the big grass tundra west of Boas River. This species and the Red Phalarope are the common nesting land birds in this region which is probably too wet for many species. It was already numerous when I reached the Bay of God's Mercy on June 20, and its characteristically high-pitched trill was the dominant sound of the tundra until the young were hatched about the middle of July. It reminded me of grasshopper-haunted meadows at home. I never saw the bird on the islands in the mouth of the river, and obtained only one genuine downy about four days old on July 24. Young birds, some of them certainly less than a week old, were common around high-tide mark near my west camp on August 3. There are no records of this species north of the southern shore of Southampton Island where Sutton [1932: 142–147] found it the commonest nesting sandpiper in the South Bay region. I never saw it in the Iglulik area, and Manning did not collect it from Frozen Strait.

[At Taverner Bay, Semipalmated Sandpipers are not as common as White-rumped Sandpipers, either in migration or as summer residents, but they are rather more numerous amongst the ridges to the north. None were seen north of Straits Bay. They were numerous at the Bird Islands on August 1, 1938. They probably nest in suitable places over most of Southampton Island, but I saw none at Frozen Strait.—T. H. M.]

SANDERLING, *Crocethia alba* (Pallas).—I never saw this species on the north shore of the Bay of God's Mercy, which is probably too muddy. Manning took three specimens on July 16 at Gibbons Point, on the beaches of disintegrated limestone forming the east shore of the bay. Sutton [1932: 148] suspected that the species nested on the western part of the island, but he had no certain evidence.

Although I took special trouble to look for it in 1937, especially at the mouth of Crozier River where shingle beds and banks of sand and mud made up what seemed to me a perfect Sanderling country, I did not identify a single individual. I never saw it amongst the flocks of migrating shore birds on Iglulik Island in August, and if it occurs at all in this region, it is uncommon or very local.

[I saw no others besides the three above mentioned. The only record for Baffin Island is a small flock seen by Kumlien (1879: 87) at Niantilik, Cumberland Sound. Sutton (1932: 148–150) noted it as a migrant on Southampton Island.—T. H. M.]

RED PHALAROPE, *Phalaropus fulicarius* (Linnaeus).—The commonest breeding land bird on the grass tundra near the shore at the Bay of God's Mercy. Exceedingly numerous. Most of the birds had arrived when I reached the area on June 20, although we found them still quite common at the edge of the open water about six miles off shore at Chesterfield and in Roe's Welcome. I used to see both sexes, at the nest and on the pools of melted snow near high-water mark, up to July 4. On July 10, there were large flocks of females playing and feeding at the edge of the sea (the ice having very recently gone out from the head of the bay). I saw no more females after July 11.

In 1937, the species was not numerous in Crozier River area; about six pairs nested in the low limestone country at the mouth, in the long grass at the edges of permanent pools. It seems to require a much damper habitat than Baird's Sandpiper. It was first seen when a pair occupied the pool in front of my tent on July 19. On Iglulik Island, from August 12 at least until the end of the month, young birds teemed on the shallow inland pools, and off the eastern coast of the island. They were even commoner than the White-rumped Sandpipers, and more numerous than they ever were at the Bay of God's Mercy. There, the numbers did not increase greatly during August. All birds observed during migration were juveniles. At least three pairs nested on Abadyar Island. I do not know if the species nests on Iglulik Island. Manning took one specimen at Gibbons Point in July in practically full winter plumage.

[Red Phalaropes are probably common in all suitable districts on Southampton Island. None were seen on the northeast coast of the island, and only two at Frozen Strait. They were by far the commonest birds in the coastal area on the very flat land between Koukdjuak and Taverner Bay, Baird Peninsula, and Bray and Kock Islands towards the end of August, 1940.—T. H. M.]

NORTHERN PHALAROPE, *Lobipes lobatus* (Linnaeus).—Sutton (1932: 156) obtained one specimen from South Bay. No record for the mainland coast north of Chesterfield; no record for Baffin Island.

[A male and female were taken at Taverner Bay on July 25, 1939, and a female a little to the south of there on July 4, 1940.—T. H. M.]

POMARINE JAEGER, *Stercorarius pomarinus* (Temminck).—The least common of the jaegers in the Bay of God's Mercy region. I never saw one there, though Sutton (1932: 157) obtained it at Cape Low. I saw none during our trip up Roe's Welcome to York Bay in September.

In 1937, I saw the species only on Iglulik Island. Five birds (three

dark, of which I collected one, and two with light under parts) frequented the southeast corner of the island, at least from August 21 until I left on August 31. They were especially attracted by the remains of a white whale left by the Eskimos at Iglirssuit when I was the lone inhabitant of the place. I never saw the Long-tailed Jaegers at the carcase, but Herring and Glaucous Gulls used to feed there with the Pomarine Jaegers. The natives say the species breeds here and there in the area, but is nowhere numerous.

[I saw no Pomarine Jaegers except between the Koukdjuak River and Taverner Bay where they almost certainly breed.—T. H. M.]

PARASITIC JAEGER, *Stercorarius parasiticus* (Linnaeus), (Iglulik name, 'Ishungnuk').—Much more common than the Long-tailed Jaeger in the western part of Southampton Island. At least five pairs nested in 1936 along some twenty miles of shore line on either side of the head of the Bay of God's Mercy. Birds were seen at every landing on the shore of Roe's Welcome in September. I saw thirteen at the head of the Bay on July 9, but could not find a nest. I observed no other trace of a colonial habit. All the birds were in the light phase.

I never saw this bird in 1937. There are few satisfactory data as to its status north of Southampton Island and Koukdjuak River.

LONG-TAILED JAEGERS, *Stercorarius longicaudus* Vieillot.—Much the commonest jaeger in the northwest Foxe Basin area. At least six pairs nested in 1937 on the shores of Quilliam Creek and at the mouth of Crozier River. Seen on Abadyar, Iglulik, and Ugliakdjuk Islands (at least three pairs on Iglulik). I collected a young bird on Iglulik, August 31.

On Southampton Island I found this species much less common than the last. I saw only one pair, and collected the female, near my west camp, in June.

[In general, I think the Parasitic Jaegers are commoner than the Long-tailed on Southampton Island, though at certain times they are outnumbered locally by the latter. I saw no jaegers on the northeast coast of Southampton Island or at Frozen Strait. Both Parasitic and Long-tailed Jaegers were very abundant, nesting between Koukdjuak and Taverner Bay. North of the latter place a few Parasitic Jaegers were seen, but no Long-tailed Jaegers were definitely identified west of Munk Island. At the east end of that island two Long-tailed and three Parasitic Jaegers were seen.—T. H. M.]

GLAUCOUS GULL, *Larus hyperboreus* Gunnerus.—Less common in the Iglulik area than the next species. Throughout the summer it occurs throughout the district, but I do not know of any nesting colony.

[No nesting colonies of this species were seen on the east side of Foxe Basin, but in the fall immature birds were quite numerous at Hantzsch River and Taverner Bay. None were seen at Frozen Strait. The only colony I know on Southampton Island is at the mouth of Canyon River where there were about twenty nests in 1937. Nine pairs nested on Walrus Island in 1936.—T. H. M.]

HERRING GULL, *Larus argentatus smithsonianus* Coues.

THAYER'S GULL, *Larus a. thayeri* Brooks.—There is a large colony of Herring Gulls on the cliffs of the western part of Abadyar. Two pairs nested on isolated rocks in pools at the mouth of Crozier River, one in each pool. I collected three young birds, less than 24 hours old, on August 18. I collected a dozen skins, averaging rather dark *thayeri,* but they were all eaten by puppies after a storm of September 26. I saved only a single wing, from a bird shot between Iglulik and Nerdlonaktoq Islands on August 11. This bird was noticeably pale in flight, and is not much darker than some of the probable *kumlieni* in the Canadian National collection.

At the Bay of God's Mercy, where gulls breed commonly on the smallest islands in the mouth of Boas River (within the area of the Brant), the first young hatched on July 26. I took a fully fledged young bird on Iglulik Island at least twenty miles from any nesting site, August 23. On August 20, at the Bay of God's Mercy, the young gulls were still unable to fly, but they were mostly on the wing by August 29. The birds from the Bay of God's Mercy seem to be very nearly typical *smithsonianus.* Manning has a number of skins from Polecat Harbour, Frozen Strait, which are very similar to Southampton specimens. This district is about 150 miles south of Iglulik. There is a famous gull cliff near the Hudson's Bay Company's post at Repulse Bay, which gives to the region its native name, Naujan.

[Herring Gulls are common on all the coasts of Southampton Island, Foxe Basin, and scattered nests occur in many places. There is a large colony at Brooks Bluff, eight miles east of Polecat Harbour, and several colonies of varying sizes on the south side of Frozen Strait and the northeast coast of Southampton Island. There are two colonies near the north end of Taverner Bay, and one near Straits Bay. The specimens collected from these places have not yet been compared.—T. H. M.]

IVORY GULL, *Pagophila alba* (Gunnerus).

ATLANTIC KITTIWAKE, *Rissa tridactyla tridactyla* (Linnaeus).—I saw neither of these birds. The Iglulik natives say that Naujavah, the small white gull with black legs, is occasionally seen in late fall in the north-

western part of Foxe Basin. Iktukshakdjuk, the 'Old King,' told me that many years ago he found enormous numbers nesting in the interior of Brodeur Peninsula and on the cliffs of Prince Regent Inlet (Port Bowen region). He had been nearly starving, and lived for some time on the eggs. J. C. Ross [1835: xxxv–xxxvi] reported both these species breeding near Port Bowen, but no one has collected Kittiwakes west of the Atlantic coast, or breeding Ivory Gulls from Canadian territory. I have one summer skin from Arctic Bay where the species is fairly numerous.

[Sutton (1932: 182) and I each obtained an Ivory Gull from Southampton Island. Sutton (1932: 183) considered the Atlantic Kittiwake a rare migrant there.—T. H. M.]

SABINE'S GULL, *Xema sabini* (Sabine).—Breeds commonly immediately above high water in the flooded marshes at the Bay of God's Mercy, and together with terns, nests on islands in the mouth of Boas River, although the terns are everywhere more numerous. I first took young (less than 24 hours old) on July 23. I saw no young birds flying before August 14. Most of the adults left the island during the last ten days of August. At this date they are still in almost complete summer plumage.

In 1937, I did not see the species until August 12, off Nerdlonaktoq Island. Later I found two families in the southeastern part of Iglulik Island. The parents and young were still together. The natives seemed to admire my specimens greatly, so I think the species is not very common in the region. On Iglulik, as on Southampton, the Sabine's Gulls are closely associated with terns.

Their call reminded me of a rusty clockwork mechanism being wound up; they are less noisy than the terns, and the voices of the two are really very different.

[Sabine's Gulls nest abundantly between Koukdjuak River and Taverner Bay. At the end of August, 1940, I saw several including juveniles on Baird Peninsula and Bray Island. On Southampton Island, Sutton (1932: 184–189) found them nesting in the South Bay region. I saw none on the northeast side of the island, at Frozen Strait or at Leyson Point, although terns were numerous at the last place.—T. H. M.]

ARCTIC TERN, *Sterna paradisaea* Brünnich.—Abundant breeder at the Bay of God's Mercy, and at several points on the Roe's Welcome coast. I took the first young bird, less than 24 hours old, on July 19.

During my stay at the mouth of Crozier River in 1937, I saw only one tern, in July. It does not nest in Quilliam Creek, and I never

saw one in Fury and Hecla narrows. But it is an astonishingly abundant breeder on some of the small low islands, both granite and limestone, in Hooper Inlet, and between Abadyar and Nerdlanktoq. It also nests in some numbers on the east coast of Iglulik Island. There is considerable variation in the color of the nestlings. Eggs and newly hatched young were seen as late as August 12.

[Arctic Terns are common on all the low coast of Southampton Island, but I saw none at Frozen Strait, the northwest coast of Southampton Island, or Seahorse Point. On August 15, 1938, I saw over 2,000, including young, on the islands off Cape Dorchester. They were common between Koukdjuak and Taverner Bay, but nests were found only at the north end of the bay. Terns were seen intermittently around the northeast coast of Foxe Basin. A considerable number nest on an island off the northeast corner of Munk Island. —T. H. M.]

BRÜNNICH'S MURRE, *Uria lomvia lomvia* (Linnaeus), (Eskimo name, 'Akpa').—I did not see this species in western Southampton Island in 1936. There are large colonies on the limestone cliffs of Coates Island.

I saw a few (and handled one) amongst the Mandt's Guillemots, February, 1937, at the floe edge off Iglulik Island. The natives do not often see them, and know of no breeding place in Foxe Basin, but there are famous colonies in the Navy Board Inlet region and northeastern Somerset Island.

[At Taverner Bay, I saw eight on July 11 and twelve on July 15, 1938. They do not nest on Southampton Island, and I saw none until eight miles off Seahorse Point on July 18. They became numerous as Nottingham Island was approached. Sutton obtained a few specimens from the South Bay region.—T. H. M.]

DOVEKIE, *Alle alle* (Linnaeus).—I saw no individuals, but the Igluliks know the bird ('Akpilliakdjuk') well, and consider it commoner than Brünnich's Murre. It is most often seen in spring. There are no records of breeding anywhere in Canadian territory.

MANDT'S GUILLEMOT, *Cepphus grylle mandti* (Mandt), (Iglulik name, 'Pitiulaq').—Abundant in some of the waters surrounding Southampton Island. Common at the edge of the floe in Roe's Welcome and off Chesterfield in June. Abundant breeder on Walrus Island, South Bay.

It is common throughout the winter at the floe edge off Iglulik. Breeds on numerous small islands in Hooper Inlet, and is probably distributed all over northwestern Foxe Basin and the east coast of Melville Peninsula, but is nowhere very common. I have downy

young from a tiny limestone islet between Abadyar and Nerdlanaktoq. A large tern colony had occupied the islet, and there were just two families of guillemots amongst the terns. I saw guillemots in August amongst the islands which block the entrance to Quilliam Creek, but none in the neighborhood of my summer camp at its head, nor at Fury and Hecla narrows.

[Mandt's Guillemots occur along most of the granite coasts of Foxe Basin and Southampton Island, but are less common off the limestone shores. None were seen on the sea bordering the Great Plain of the Koukdjuak.—T. H. M.]

SNOWY OWL, *Nyctea nyctea* (Linnaeus).—It is strange that owls are very uncommon amongst the nesting geese at the Bay of God's Mercy. Manning saw a single owl there on August 28, and there was a pair, presumably nesting, near a pool on the edge of the dry plateau about ten miles south of the head of the bay. The years 1936 and 1937 were both bad lemming years. I saw no owls during the winter until May 29, a single bird near the head of Admiralty Inlet. A pair nested on a rocky knob of disintegrated limestone about two miles from the head of Quilliam Creek. I saw one on Abadyar Island in September.

[Snowy Owls were seen occasionally in all districts.—T. H. M.]

HORNED LARK, *Otocoris alpestris* (Linnaeus).—This species is not present in the marshy tundra of the Bay of God's Mercy region. It is fairly common all around Foxe Basin. Manning collected a number from Frozen Strait in June. Nine adults taken from my summer working area in 1937, from June 18 to July 10, are all very alike, pale, and possibly near to *hoyti*. Seven adults and young collected on August 1 are very pale. Four migrant birds collected on Abadyar Island, September 3, are darker; one, very bright yellow, seems very near *alpestris*. It is possible that a new race is represented amongst the light birds from the eastern Arctic, but there is no more to be said without bringing together the Iglulik birds and the existing series from Southampton Island and southern Baffin Island.

Horned Larks are said not to occur on Iglulik Island itself, nor in the neighborhood of the native camps on the flat limestone coast south of Hooper Inlet. The species is a fairly common breeder in the Crozier River region—in the drier limestone meadows, on the high, dry, limestone plateau, up to 800 feet on the highest of the bleak hills overlooking Fury and Hecla narrows and, most commonly of all, in the little valleys between the granite ridges west of the river. Only Baird's Sandpiper has so wide a range of habitat. I

saw no migrants on Abadyar, August 8 to 12, and none on Iglulik Island, but they were quite common when I returned to Abadyar on September 2, and remained so until I left on September 14. First arrivals were one pair, noted on June 15, at the mouth of Crozier River. They were common at Polecat Harbour; noted at Frozen Strait on October 3, 1936.

[Horned Larks are fairly numerous summer residents at Frozen Strait, Seahorse Point and north end of Taverner Bay. Taverner (1941) has provisionally identified specimens from the latter place as *hoyti;* the others have not yet been compared.—T. H. M.]

NORTHERN RAVEN, *Corvus corax principalis* Ridgway, (Iglulik name, 'Tullugaq').—Ravens were nowhere numerous while I was in the north. They were absent from the marshes at the Bay of God's Mercy, and only twice seen in September on the Roe's Welcome shore. One or two Ravens remained near the Hudson's Bay Company's post at Repulse Bay, at least until I left on December 21, and one was near Eqe, northeast Foxe Basin, in late March. One brood (three young) was raised near the mouth of Crozier River, and I saw the birds from time to time throughout the summer, but did not collect them. In September I saw one bird on Abadyar Island. The Iglulik Eskimos regard Ravens with a certain amount of superstitious dread.

[Several Ravens were seen during the summer at Frozen Strait, the northeast coast of Southampton Island, and Seahorse Point. A few were seen during the spring and fall at Hantzsch River. At Cumberland Sound I saw nine together on February 22, 1940.—T. H. M.]

GREENLAND WHEATEAR, *Oenanthe oenanthe leucorhoa* (Gmelin).—I have a single specimen from Arctic Bay. I did not hear of any other occurrences. There are no records of Wheatears from any of the shores of Hudson Bay or Foxe Basin, although they have penetrated Hudson Strait as far as Lake Harbour [Sutton 1932: 223] and have been reported from Boothia Peninsula [Ross, 1835: xxvi].

[I collected a single specimen at Taverner Bay on September 2, 1939.—T. H. M.]

AMERICAN PIPIT, *Anthus spinoletta rubescens* (Tunstall).—Occurs up the east side of Melville Peninsula at least as far as Fury and Hecla Strait. This is probably near the northern extremity of the range, and they are very local. I found Pipits breeding only on the sheltered south slopes of the big valley which runs from the head of Quilliam Creek to Fury and Hecla narrows. There was a pair breeding in each one of four sheltered meadows. On August 9, I saw four Pipits in the western part of Abadyar Island, and migrant

birds were rather common around the native houses (southeastern part) from September 2 to 14, where they were associated with Horned Larks. This seems to suggest that the species extends across the strait to Cockburn Land.

[Pipits are fairly numerous summer residents at Frozen Strait and Seahorse Point. On several days in mid-August, 1938, they were the commonest bird on the northwest coast of Southampton Island. On the east side of Foxe Basin, I saw them only at Hantzsch River in late August and early September. On July 21, 1938, they were the most abundant bird at the northeastern end of Salisbury Island. —T. H. M.]

HOARY REDPOLL, *Acanthis hornemanni exilipes* (Coues).

HORNEMANN'S REDPOLL, *Acanthis h. hornemanni* (Holboell).

COMMON REDPOLL, *Acanthis linaria linaria* (Linnaeus).

GREATER REDPOLL, *Acanthis l. rostrata* (Coues).—Redpolls are exceedingly uncommon in northwest Foxe Basin. When I reached Arctic Bay in May, I was told by natives as well as the white men at the post, that redpolls had been common all through the winter. During my stay the weather was bad, but I have two specimens collected by natives on May 12 and May 18. Many of the Iglulik natives who saw these specimens assured me that the birds were never seen in their country. Southampton Island and the north coasts of Baffin Island are well known for redpolls. The natives say that they are commoner in winter than in summer at Arctic Bay and at Pond Inlet, and that they are sometimes found in the coldest weather, huddled together in little colonies underneath the snow. They are compared with ptarmigan in this respect.

My specimens appear to be near *rostrata,* although the bills are a little heavier than those in the Canadian National collection. There is no other evidence that this race winters regularly so far north. The only forms which have been established as breeding in Canadian territory are the two smaller ones, *linaria* and *exilipes,* neither of which has been proved to occur north of Coral Harbour, Southampton Island. *Rostrata* has been found in Greenland, nesting. The relation between these forms is interesting. It is worth noting that, at any rate in Canada, in latitude 70° N., there are no bushes comparable with the willow thickets which form the nesting sites of redpolls in Southampton and southern Baffin Islands.

[There is no definite evidence that redpolls nest on Southampton Island. Sutton (1932: 226–334) found redpolls quite common there during migration, but *exilipes* was the only one he saw during the

breeding season, and that only a few times. At Seahorse Point I collected two redpolls on May 31, and two more on June 15, 1938. I saw no others on the island or at Frozen Strait. On the west side of Foxe Basin, twelve were seen on various dates. Taverner (1941) identified the only adult collected as *rostrata*.—T. H. M.]

SLATE-COLORED JUNCO, *Junco hyemalis hyemalis* (Linnaeus).—Occurrence north of the tree limit is accidental, but records are surprisingly common. An individual picked up exhausted on May 25 at the Hudson's Bay Company's post at Repulse Bay, and preserved by Manning, constitutes the most northerly of these. Other records are from Coral Harbour [Sutton, 1932: 235–236] and Southern Baffin Island.

WHITE-CROWNED SPARROW, *Zonotrichia leucophrys* (Forster).—[A very fat juvenile female was collected at Taverner Bay on September 17, 1939. This, according to Taverner (1941), constitutes a new record for Baffin Island.—T. H. M.]

LAPLAND LONGSPUR, *Calcarius lapponicus lapponicus* (Linnaeus).—The most generally distributed of the breeding land birds throughout the areas visited by us, and in many places the most numerous. It arrives a good deal later than the Snow Buntings, but before the larks and waders. In 1937, I first noted it near the head of Gifford River, latitude 70° N., on May 28. I found a nest with six eggs on the south shore of Quilliam Creek, June 11. Newly-hatched young were first seen on July 5, at Crozier River. Most of the young Longspurs were awing before July 13. Not many birds were left on September 14 when I left Abadyar. Longspurs were not very numerous on the Bay of God's Mercy marshes; I suppose these were too wet for the species.

[Longspurs are numerous in suitable districts on Southampton Island and the west side of Foxe Basin. They are scarce in the coastal area of the Great Plain of the Koukdjuak, but become more numerous inland.—T. H. M.]

EASTERN SNOW BUNTING, *Plectrophenax nivalis nivalis* (Linnaeus).—Extremely numerous, but confined rather strictly to rock exposures, particularly the masses of rotting limestone on the south side of Quilliam Creek. It is absent from the marshes and grass tundra and few or none remain in winter. I saw none in the Repulse Bay area after early November, and none during our winter journeys until late April in Admiralty Inlet. Nests are often in the farthest recesses of the disintegrating rocks; both nests and young birds are exceedingly hard to find until the young can fly, around June 13.

This is by far the tamest of the northern species, a real Arctic robin. Throughout the second half of July, a brood made my tent its home, and there were almost always several birds perched on the canvas or the guys. When I put up a second tent on the west bank of the river, it was at once adopted by another family; just the same happened at Iglulik, and twice on Abadyar.

[Snow Buntings are numerous in all suitable rocky localities. –T. H. M.]

REFERENCES CITED

BAIRD, P. D.

1940. British Expedition to North Baffin Island 1938–1939. Polar Record no. 19: 225–227.

HENNESSEY, FRANK C.

1910. Report of Mr. Frank Hennessey on the Birds, Animals, Crustacea and Fauna collected on the Expedition of the "Arctic" in 1908–1909. *In* Capt. J. E. Bernier, report of the Dominion of Canada Government Expedition to the Arctic Islands and Husdon Strait: 502–513.

HESSE, ERICH

1915. Bernard Hantzsch's ornithologische Ausbeute in Baffinland. Journ. f. Ornith., 63: 137–228. (References quoted from manuscript translation by R. M. and M. B. Anderson.)

KUMLIEN, LUDWIG

1879. Contributions to the Natural History of Arctic America, made in Connection with the Howgate Polar Expedition 1877–78. U. S. Nat. Mus. Bull., 15: 1–179. (Published under the direction of the Smithsonian Institute.)

MCATEE, W. L.

1940. Obituary: Reynold Jocelyn Onslow Bray. Auk, 57: 139–140.

MANNING, T. H.

1942. Blue and Lesser Snow Geese on Southampton and Baffin Islands. Auk, 59: 158–175, pl. 7, 1 map.

M'CLINTOCK, FRANCIS L.

1860. The Voyage of the "Fox" in the Arctic Seas. A Narrative of the Discovery of the Fate of Sir John Franklin and His Companions; 375 pp., 16 pls. 4 maps. (Ticknor and Fields, Boston.)

PARRY, WILLIAM EDWARD

1824. Journal of a Second Voyage for the Discovery of a North-west Passage from the Atlantic to the Pacific, performed in the years 1821–22–23 in His Majesty's Ships "Fury" and "Hecla." 571 pp., 31 pls., 4 maps. (John Murray, London.)

RAE, JOHN

1850. Narrative of an Expedition to the Shores of the Arctic Sea in 1846 and 1847. VIII + 247 + [1] pp. with maps. (T. & W. Boone, London.)

ROSS, JAMES CLARK

1835. Appendix to the Narrative of a second voyage in search of a North-west Passage, and of a residence in the Arctic Regions during the years 1829, 1830, 1831, 1832, 1833, by Sir John Ross . . . , including the reports of Commander, now Captain, James Clark Ross. Section on Birds: XXV–XLV. (A. W. Webster, London.)

RICHARDSON, JOHN
1825. Account of the Quadrupeds and Birds. Appendix to Captain Parry's Journal of a Second Voyage for the Discovery of a North-west Passage in the years 1821–22–23. Zoological Appendix no. 1: 202–397. (John Murray, London.)

SNYDER, L. L.
1941. On the Hudson Bay Eider. Occas. Papers Royal Ontario Mus. Zool., no. 6: 1–7.

SOPER, J. DEWEY
1928. A Faunal Investigation of Southern Baffin Island. Nat. Mus. of Canada, Bull., 53: 1–143, 7 pls., 1 map.

SUTTON, GEORGE MIKSCH
1932. The Birds of Southampton Island. Mem. Carnegie Mus., 12, (2, sect. 2): 1–275, pls. 11–24.

TAVERNER, P. A.
1936. Birds of the Eastern Arctic. *In* Canada's Eastern Arctic, its History, Resources, Population, and Administration. Assembled by W. C. Bethune for the Northwest Territories Council: 113–128, 6 pls.

(Unpublished.) Remarks on Birds Collected by T. H. Manning on Baffin Island. (In MS).

Ottawa, Ontario

NOTES ON BIRDS OF THE KODIAK-AFOGNAK ISLAND GROUP

BY VICTOR H. CAHALANE

DURING the autumn of 1940, while gathering field data for the National Park Service, I spent about two weeks in the region of Shelikof Strait, southwestern Alaska. I arrived at Kodiak on September 25 and departed for Seward on October 11. Parts of two days (September 29 and October 10) of this period were devoted to field work in the vicinity of Kodiak village and four days (September 30 to October 3, and October 8) in cruising along the northern and western coasts of Kodiak Island as far south as Larsen Bay and Uyak 'village.' Visits were made ashore at two points on southern Afognak Island, on Raspberry Island, and in Viekoda, Terror and Larsen Bays on Kodiak Island. In making this cruise in the seiner 'Hazel M,' I am greatly indebted for the help of my companion and pilot, N. J. Benson of Kodiak, Wildlife Agent of the Alaska Game Commission.

I had no opportunity to collect specimens, but kept notes on the birds observed. Because of the relative scarcity of field notes on the birds of this region, especially so late in the season when danger of fierce storms discourages excursions by boat, these sight observations may be worth recording. With the single exception of the Gadwall

(*Chaulelasmus streperus*) all species seen by me have already been recorded in Friedmann's list of 'The Birds of Kodiak Island, Alaska' (Bull. Chicago Acad. Sci., 5, no. 3: 13–54, Sept. 10, 1935).

Kodiak Island is 105 miles in length, in a northeast-southwest direction, and 60 miles wide at right angles to this. The west side is fissured by long, narrow fiords. Afognak and Raspberry Islands, which once formed the northern portion of the pre-Kodiak land mass, are now separated by the narrow Raspberry and Kupreanof Straits. They are both considerably smaller in size than Kodiak Island and are much lower in elevation.

With the exception of the northeastern and entire southern portions of Kodiak Island, the shores rise fairly steeply from the sea. The rugged, completely barren central ridge of Kodiak rises, on one peak at least, to approximately 4200 feet. Most of the rounded slopes below approximately 3000 feet (which include all of Afognak and Raspberry Islands) are clothed in dense grass, and patches of alders and willows (modified Arctic Zone). The single exception is the fairly dense spruce forest (Hudsonian Zone) fringing some of the lower areas of Afognak Island, and the northeastern portion of Kodiak Island north of a line between Point Chiniak and Outlet Cape.

PACIFIC LOON, *Gavia arctica pacifica* (Lawrence).—All loons identified belonged to this species. They were common on the coastal waters and inlets from Kodiak village to Uyak Bay. Loons were especially numerous in Kupreanof Strait, October 1, and in Raspberry Strait on the eighth.

HOLBOELL'S GREBE, *Colymbus grisegena holboelli* (Reinhardt).—This grebe was numerous in Uyak Bay. A few were seen in Kupreanof Strait.

HORNED GREBE, *Colymbus auritus* Linnaeus.—I saw several Horned Grebes in Viekoda and Terror Bays, October 1.

BLACK-FOOTED ALBATROSS, *Diomedea nigripes* Audubon.—A number were seen October 2 off the western coast of Kodiak Island between Uganic Bay and Cape Ugat. With a few gulls, these albatrosses were the only birds that continued an active hunt for food on a day so windy that our seine-boat was throttled down to half-speed. While we labored and rolled over huge waves that appeared to be 30 feet high, the albatrosses soared over the crests and skimmed down the troughs with the greatest of ease.

WHITE-CRESTED CORMORANT, *Phalacrocorax auritus cincinatus* (Brandt).—Cormorants, apparently all of this species, were abundant. Almost as soon as our pilot had cut his motor and moored the plane

in the harbor of Kodiak village, one of these birds swam up to inspect it, curiously. For the following ten days, as long as I was on water, cormorants were never far away. They were very common and characteristic on Kupreanof Strait and numerous in Viekoda and Uyak Bays. The population was even heavier in the bays of the Katmai National Monument.

COMMON MALLARD, *Anas platyrhynchos platyrhynchos* Linnaeus.—A large number of Mallards were feeding with other ducks at the head of Terror Bay and in the marshy stream flowing into it (October 2).

GADWALL, *Chaulelasmus streperus* (Linnaeus).—N. J. Benson, warden of the Alaska Game Commission who accompanied me on my trip in Shelikof Strait, shot two Gadwalls at the head of Terror Bay, on October 2. I made no other observations of this species. Friedmann does not mention it in his list and it therefore is an addition, although the specimens were not saved.

GREEN-WINGED TEAL, *Nettion carolinense* (Gmelin).—Teals were numerous nearly everywhere in the waters around Kodiak Island in early October. There were numbers in Viekoda Bay. At the head of Terror Bay they were feeding in the company of Mallards. A constant procession of ducks of both species was moving between the open bay and the marshy pools in the great flat. The greatest numbers of teals were found in Raspberry Strait.

GREATER SCAUP DUCK, *Nyroca marila* (Linnaeus).—'Bluebills,' presumed to belong to this species, were fairly common in the northern and western bays of Kodiak Island.

WESTERN HARLEQUIN DUCK, *Histrionicus histrionicus pacificus* Brooks.—Harlequins were abundant in Viekoda, Terror and Uyak Bays, October 2 and 3.

WHITE-WINGED SCOTER, *Melanitta deglandi* (Bonaparte).—In the waters visited around Kodiak Island, White-winged Scoters were the most conspicuously numerous of all the waterfowl. Viekoda and Terror Bays and Kupreanof Strait seemed to be the most favored areas. On October 8, as we sailed from Raspberry Strait across the front of Afognak village toward the bay of the same name, the water was covered with enormous flocks of scoters, almost entirely Whitewings. They rose in front of us in clouds, and for a long time separate small flocks were milling around or getting out of our way.

AMERICAN SCOTER, *Oidemia americana* Swainson.—I identified a small number of American Scoters in Viekoda Bay and a large number in Uyak Bay.

RED-BREASTED MERGANSER, *Mergus serrator* Linnaeus.—This species was generally very abundant in waters around Kodiak and Afognak Islands. Just above the cascade on Afognak River, on October 8, I surprised a pair. They were swimming in the large pool at the head of the falls when I appeared on the rocks just above and only about 75 feet away. The male hesitated only briefly. He dived, came up in the swift current and went downstream with a rush, passing through a great waterwheel that arched over the rocks at the head of the cascade. The female dived hurriedly a number of times and finally flew directly into the air out of the last dive and disappeared downstream among the spruces.

NORTHERN BALD EAGLE, *Haliaeetus leucocephalus alascanus* Townsend.—Several Bald Eagles usually were seen in a day's travel along the northern and western coasts of Kodiak Island. Two or three, for example, were seen in a few hours in Viekoda Bay, October 1.

RED PHALAROPE, *Phalaropus fulicarius* (Linnaeus).—N. J. Benson told me that in August, 1940, he had seen a flock of "at least five thousand" of the "whale birds" in Shelikof Strait.

NORTHERN PHALAROPE, *Lobipes lobatus* (Linnaeus).—Quite numerous everywhere around Kodiak Island.

GLAUCOUS-WINGED GULL, *Larus glaucescens* Naumann.—In all areas visited around Kodiak and Afognak Islands, Glaucous-winged Gulls were numerous to abundant. Hundreds were congregated on the morning of October 1 in Kupreanof Strait, southwest of Afognak village. Here they were feeding in the tide-rip on the vigorously jumping herring.

PACIFIC KITTIWAKE, *Rissa tridactyla pollicaris* Ridgway.—An interesting spectacle of thousands of Kittiwakes was afforded in Kupreanof Strait on the morning of October 1, when the tide-rip forced a school of herring to the surface. The following day was clear but very windy—a poor day for fishing by any except the most expert fliers. The Kittiwakes evidently found it too rough. On the smooth, wet gravel beach forming the south side of outer Uyak Bay, Kodiak Island, I saw great flocks of these birds, arranged in row on row, all facing into the wind to avoid ruffling their feathers.

One of the notable wildlife assets of the Kodiak-Afognak group is the great Kittiwake colony on the southern end of Whale Island. Excepting only the White-winged Scoter in autumn, the Kittiwake is the most abundant bird in this general area.

CALIFORNIA MURRE, *Uria aalge californica* (Bryant).—Friedmann states that the Murre appears to be a common bird on Kodiak Island.

I saw the species in only one area—Uyak Bay, on October 3—where it was plentiful.

MARBLED MURRELET, *Brachyramphus marmoratus* (Gmelin).—Some murrelets, presumably this species, were seen in Kupreanof Strait on October 1. I also observed several in Viekoda Bay. The species did not appear common.

HORNED PUFFIN, *Fratercula corniculata* (Naumann).—Said to be an abundant resident. I saw only a few birds in but one area—Viekoda Bay, on October 1.

TUFTED PUFFIN, *Lunda cirrhata* (Pallas).—This is also said to be a common bird, but I observed only a few, all in Viekoda Bay.

WESTERN BELTED KINGFISHER, *Megaceryle alcyon caurina* (Grinnell). —I saw several kingfishers on the small lakes and streams north of Kodiak village, between that place and Mill Bay, September 29.

AMERICAN MAGPIE, *Pica pica hudsonia* (Sabine).—Probably common. Several Magpies were seen in the valley at the head of Terror Bay, and individuals were noted at several other points on Kodiak Island.

NORTHWESTERN CROW, *Corvus brachyrhynchos caurinus* Baird.—This species was very abundant throughout the Viekoda Bay area. I saw a flock of several hundred at the head of Terror Bay on October 1. Here they were congregated on the mud flat and along the mouth of the large creek, feeding, presumably, on animal life exposed by the falling tide.

YUKON CHICKADEE, *Penthestes atricapillus turneri* (Ridgway).—Chickadees, supposed to be of this species and race, were common at all stopping places on Kodiak and Afognak Islands.

DIPPER, *Cinclus mexicanus unicolor* Bonaparte.—Along the Afognak River, on October 8, I saw a number of Ouzels. Two of the birds came to investigate me while I was photographing the cascade or so-called Afognak Falls. One Ouzel perched on a rock only thirty feet away and scolded vigorously for several minutes.

PACIFIC VARIED THRUSH, *Ixoreus naevius naevius* (Gmelin).—This thrush was abundant in the old-growth spruce forest on the shore of Back Bay, south of Afognak village. Its calls and song fairly resounded through the trees on the early morning of October 1 and, with the slanting beams of the sun, created an almost cathedral-like atmosphere.

RUSTY BLACKBIRD, *Euphagus carolinus* (Müller).—During my stay in Kodiak village, October 9–11, Rusty Blackbirds were abundant. Several times I observed flocks of thirty or forty birds foraging in yards and gardens.

BISCHOFF'S SONG SPARROW, *Melospiza melodia insignis* Baird.—This was a common bird, seen in nearly every suitable place where I stopped on Kodiak and Afognak Islands. The species was especially abundant along the Afognak River, and in Viekoda and Terror Bays. It was also observed lurking under the cannery buildings and in nearby alder thickets at Larsen Bay.

Fish and Wildlife Service
Washington, D. C.

MAJOR CHANGES IN THE BIRD LIFE OF SOUTHERN LOUISIANA DURING SIXTY YEARS

BY E. A. MCILHENNY

PROBABLY no section of North America in its primitive state was richer in bird life through the year than southern Louisiana, and this was especially true of the forests, marshes and prairie areas for fifty miles and more inland from the Gulf of Mexico. It is of interest, therefore, from an ornithological standpoint, to note the marked changes in the birds of this area which have taken place in the more than sixty years during which I have been of a sufficient age to be a close observer of its bird life.

When I was a boy, in the years shortly after the War Between the States, southwestern Louisiana was practically a wilderness. There were no railroads west of the Atchafalaya River, and Bayou Teche was the only stream paralleling the coast from east to west, and that only as far west as New Iberia. The entire coastal area of Louisiana west of Bayou Teche and inland to where the forests began was made up of low, wet prairies or marshes near the coast, and higher, dry prairies farther inland. The only forests in this whole area were lines or groups of trees bordering the streams making inland from the Gulf. These streams were shallow, tidal bayous, navigable only for very small boats and, as their banks were low, there were no settlements along them. This type of terrain, a vast area of public lands, extended west from New Iberia for more than a hundred miles to the Texas line.

At great intervals on the prairies, homesteads had been established by ranchers who were engaged in raising cattle and horses. Large herds of these animals wandered at will, as there were no fences. The prairies were dotted with ponds and sloughs, some of them quite deep, and in summer and winter fairly swarmed with bird life. These prairies were covered with a luxuriant growth of grass, most of which

was burned off by the cattlemen in late summer and early winter, so that the livestock would have short, green grass on which to feed during the winter. These great areas of short grass provided ideal feeding and resting places for plover, sandpipers, cranes, geese, and other birds. This was southwestern Louisiana as I knew it as a boy.

In 1881, what is now the Southern Pacific Railroad crossed the Atchafalaya River at Morgan City, and was slowly built west in almost a straight line, crossing the Sabine River at Orange, Texas. In the twenty years following the building of the railroad over these level prairies from east to west, there was a tremendous change in the face of the country. A dozen or more towns were soon established along the railroad, and settlers by the thousands moved in from the north to fence and cultivate the rich, level lands. Now, this section that, when I first knew it, was entirely open and swarmed with wildfowl and waders, is covered closely by farms, and all wild life has either vanished or become so reduced in numbers as to be no longer a striking feature of the landscape.

I have attempted in this paper to make note of the most conspicuous changes in the bird life of this area, as I have observed it; first, as a boy accompanying my father who was a sportsman of note, and later, as a hunter and ornithologist in my own right, who has wandered on horseback and by small boats over the entire coastal and prairie section of southwestern Louisiana, year after year, until civilization completely ruined it.

ROSEATE SPOONBILL, *Ajaia ajaja* (Linnaeus).—Prior to 1885, the Roseate Spoonbill (local name, 'Spatule') was an abundant breeder in the great marshes bordering the prairies of Vermilion, Cameron and Calcasieu parishes. Nesting colonies existed in the marshes bordering White Lake, Vermilion Parish; Lake Misere and Grand Lake in Cameron Parish; and Black Bayou in Calcasieu Parish. These colonies were broken up by plume hunters during the ten years following 1880, at which time the plume hunters began operation in Southern Louisiana. There is only one small breeding colony of Roseate Spoonbills in Louisiana today, and this one is near Black Bayou in Calcasieu Parish.

WHISTLING SWAN, *Cygnus columbianus* (Ord) and

TRUMPETER SWAN, *Cygnus buccinator* Richardson.—Both of these fine birds (locally called 'Cygne') were regular winter residents of southwestern Louisiana before the advent of the farmer. The level prairies and marshes were plentifully dotted with small lakes, ponds and sloughs, in which grew an abundance of water plants used as

food by these great birds. In all my winter travels on horseback over these prairies, swans were seen almost every day. I never killed one, for, as a child, I was taught they were one of the beautiful creatures of nature to be protected. It was only after they had almost disappeared from our landscape that I learned to identify the two species. Now, Whistling Swans only are a rare winter visitor; Trumpeters are gone.

MOTTLED DUCK, *Anas fulvigula maculosa* Sennett.—The Mottled Duck (local name, 'Canard Noir d'été') has always nested in the coastal marshes of Louisiana, but never in great numbers, until trapping of fur-bearing animals and the killing of alligators developed into a paying industry. Up to 1905, these birds nested rather sparingly. Since that time, there has been a gradual increase in the number of nesting birds, until at the present time, the Mottled Duck is very plentiful during the spring, summer and early fall. This increase in numbers is due primarily to the extensive trapping for fur of mink and raccoons, and the killing of alligators for their hides. These two mammals destroy both the eggs and young, while alligators are death to the young ducks. Now, all three of these creatures are taken each year in great numbers in the coastal marshes, and as they have decreased, the nesting Mottled Ducks have increased. At present, the number of Mottled Ducks is a serious menace to the food supply of the northern marsh ducks which come to Louisiana for the winter. The Mottled Ducks gather in large flocks in the early fall and feed on the seeds of the natural growths such as feathergrass (*Leptochloa fascicularis* and *Panicum dichotomiflorum*), and millet (*Echinochloa crusgalli* and *Echinochloa walteri*), which to a large extent supply the winter food for our northern marsh ducks. Mottled Ducks leave Louisiana for farther south before the shooting season opens in the fall.

SWALLOW-TAILED KITE, *Elanoides forficatus forficatus* (Linnaeus).—Before the southern prairies of Louisiana, from Bayou Teche westward, became fully settled, this bird was a regular nester in the groups of tall trees bordering the bayous which made inland from the coast. As the prairies were settled and cut up into small farms, the natives, thinking the kites were birds of prey, killed them. The last-observed nesting was at Avery Island in June, 1903.

MISSISSIPPI KITE, *Ictinia misisippiensis* (Wilson).—Previous to 1910, the Mississippi Kite (locally known as 'Blue Darter') was a regular and rather common breeder in the small clumps of trees throughout the open lands of southern Louisiana. The settling up of the country

and cheap firearms have been their destruction. They are now extremely rare.

EASTERN RED-TAILED HAWK, *Buteo borealis borealis* (Gmelin).—I first noted this hawk (local name of which is 'Peank') as a breeder in the heavy timberlands of southern Louisiana four years ago, and nesting pairs have been observed each year since.

FLORIDA RED-SHOULDERED HAWK, *Buteo lineatus alleni* Ridgway.—This bird, although present as a breeder, as far back as I can remember, was never plentiful until about ten years ago. It is now a comparatively common resident, and nests wherever sufficient woodland is available to give it protection.

ATTWATER'S PRAIRIE CHICKEN, *Tympanuchus cupido attwateri* Bendire.—Before the prairies were cultivated, Prairie Chickens (locally known as 'Faisan') were abundant from the Vermilion River west to the Sabine River. The local ranchers paid no attention to them for sport or food. It was customary for the early settlers to plant near their houses several acres of chinaberry (*Melia*) trees, whose rapid growth provided wood for cooking and heating. I have often seen large flocks of Prairie Chickens feeding on the pulpy, sweet berries of these trees. There is now only one small flock of Prairie Chickens in southwest Louisiana.

WHOOPING CRANE, *Grus americana* (Linnaeus).—Before the settling of the prairies bordering the coast of Louisiana, and while these prairies were used only as cattle ranges, the Whooping Crane (locally known as 'Grue Blanche') was one of our most picturesque winter residents. Quite large flocks of them were in evidence all winter to anyone riding over the open ranges. Due to their natural shyness, they were not often killed, except by hunters who stalked them by walking alongside a horse or steer. As the flesh of the Whooping Crane was highly prized for food, its large size caused it to be killed in preference to ducks or the smaller geese. The Whooping Crane now is practically extinct in Louisiana and occurs only as a straggler.

SANDHILL CRANE, *Grus canadensis tabida* Peters.—Fifty years ago, this bird (locally known as 'Grue') was extremely plentiful throughout the prairie districts of coastal Louisiana, and nested in the marshes of Vermilion, Cameron and Calcasieu Parishes. The last nesting of which I have record was in the spring of 1896 on the prairies south of Lake Misere in Cameron Parish. At that time two nests were found while visiting a colony of Roseate Spoonbills about a mile back from the south side of the lake. In my boyhood days, just following the Civil War, one of the principal food crops grown by the ranchers

and sugar-planters of Iberia and Vermilion parishes was sweet potatoes. One hundred acres or more of these tubers were planted by my grandfather each year on Avery Island, and the Sandhill Cranes created so much depredation by digging and feeding on them that it was necessary to keep a man on horseback continuously riding over the fields during October and November, before the potatoes were harvested, to frighten the cranes away. This bird is now only a rare winter visitor.

UPLAND PLOVER, *Bartramia longicauda* (Bechstein).—As long as the prairies of western Louisiana were used as cattle ranges, Upland Plovers were extremely plentiful during both spring and fall migrations. The 'Papabotte,' as the natives called them, were highly prized for food, especially in August and September, at which time they became exceedingly fat. The method of hunting them was from horseback or horse-drawn buggy. Since the prairie lands have been fenced and cultivated, these birds have almost completely disappeared, as they will not alight in grass which is too long for them to see over. The Upland Plover is found today in small numbers only in the larger open pastures in which the grass is closely grazed.

PECTORAL SANDPIPER, *Pisobia melanotos* (Vieillot).—This little Sandpiper (locally known as 'Churook') was probably the most plentiful of all the sandpiper family in the days before the prairies of Louisiana were changed from cattle ranges to farms. They occurred in enormous flocks, in both spring and fall, in the wet prairies bordering the marshes, and were killed in great numbers by market-hunters; the usual market price was 25 cents a dozen. Since there are no more large cattle pastures bordering the marshes of Louisiana, where the grass is short enough for these birds to move about freely, the Pectoral Sandpiper has almost disappeared from the state.

LONG-BILLED DOWITCHER, *Limnodromus griseus scolopaceus* (Say).—The Long-billed Dowitcher (locally known as 'Dormeur,' the sleepy one) was one of the most plentiful of all the coastal shorebirds, inhabiting the tidal flats during the winter in large flocks and gathering to rest in close, compact groups during the middle of the day when not feeding. Unscrupulous market-hunters killed the Long-billed Dowitchers and shipped them north as 'Jack-Snipe'—*Capella delicata* (Ord). This killing was easily accomplished, for if a shot was fired into a flock and one or two of the birds fell with broken wings, the balance of the flock would circle compactly over the wounded birds, time after time. Thus the gunner would fire many shots into the same flock without moving, and frequently a majority

of the flock would be killed. The bird is now quite rare on the Louisiana coast.

BUFF-BREASTED SANDPIPER, *Tryngites subruficollis* (Vieillot).—This handsome sandpiper (locally called 'Vent Rouge' and 'Robin Snipe') was a plentiful migrant during August and early September, at which time it associated with Pectoral Sandpipers (*Pisobia melanotos*), and large mixed flocks of these two birds were a common sight in the wet prairies of the cattle ranges bordering the coastal marshes of southwest Louisiana, where they were shot in considerable numbers by the local market hunters. They are now completely absent from their former range.

FRANKLIN'S GULL, *Larus pipixcan* Wagler.—As far back as I can remember, in the early seventies, Franklin's Gulls passed over Avery Island each fall in unbelievably great numbers. During their fall migration, which was at its height the first week of November, these birds spent the night on Vermilion Bay, going inland early in the morning as far as twenty or thirty miles to feed on insects; their favorite food was various soft-bodied insects that fill the air at this time of the year in their search for suitable hiding places in which to spend the winter. Among my earliest recollections of bird life are the enormous flocks of Franklin's Gulls passing over our home in the evening and morning in long, compact streams, requiring an hour or more to pass. The flight was usually low, as the birds would take advantage of the inequalities of the land in order to avoid the strong Gulf breezes. This made the flight wavy—not only up and down, but from side to side, exactly like the course of a stream. While Franklin's Gulls are still plentiful during the fall migration, there is probably not one one-hundredth part of the number that existed prior to 1900 that now visits Louisiana.

PASSENGER PIGEON, *Ectopistes migratorius* (Linnaeus).—Prior to 1882, the Passenger Pigeon was extremely common during the fall and winter in the oak ridges and hardwood timber of southern Louisiana. The last Passenger Pigeon that I have record of seeing alive was two days after Thanksgiving Day in 1896. At that time, I was hunting Prairie Chickens in Cameron Parish, south of the then just-established town of Welsh, and killed a Passenger Pigeon that was associated with a large number of Mourning Doves, *Zenaidura macroura carolinensis* (Linnaeus), feeding in a corn and pea field.

LOUISIANA PAROQUET, *Conuropsis carolinensis ludovicianus* (Gmelin).—Flocks of this bird occurred quite regularly in the spring and fall at Avery Island during the years prior to 1881. I distinctly

remember, as a boy, a number of Paroquets being shot each spring in the mulberry trees growing on the south side of our homestead here. The last Paroquets I remember seeing were in the spring of 1881. These birds were feeding on the ripe fruit in this same mulberry grove, and were eleven in number. My uncle, General Avery, on being told the birds were present, took me with him and shot three of the birds.

Ivory-billed Woodpecker, *Campephilus principalis* (Linnaeus).—One of my first remembrances of birds at Avery Island was the Ivory-billed Woodpecker (locally known as 'Picbois Grande'). Due to the contrast of its black and white plumage when in flight, it was a conspicuous bird in the hardwood timber on the east side of the place. As this timber was cut, the birds became more and more restricted, and I have only two records of seeing the birds here since the cutting of the last big body of timber in 1918 and 1919. The bird now is completely extirpated from this section of Louisiana. The last one was recorded on August 6, 1923.

Eastern Wood Pewee, *Myiochanes virens* (Linnaeus).—A form of this pewee from my earliest remembrance has nested in the open timberlands of the extreme southern part of Louisiana. The bird nesting at Avery Island seems to be quite different in voice and coloration from those nesting farther north.

Brown Creeper, *Certhia familiaris americana* Bonaparte.—This retiring little bird was a regular winter visitor up to about 1910. From then until now, I have not seen more than three of these birds, and these at long intervals. As a boy, wandering through the woods with sling-shot, I commonly saw Brown Creepers associated with the Golden-crowned Kinglet, *Regulus satrapa satrapa* Lichtenstein, and the Ruby-crowned Kinglet, *Corthylio calendula calendula* (Linnaeus). When the voices of the kinglets were heard, I invariably looked for Brown Creepers on the trunks of the larger trees, as they were a more difficult target for the small stones from my sling-shot than were the kinglets. The creepers have completely disappeared from southern Louisiana. Both kinglets are still abundant here in the winter.

Brown Thrasher, *Toxostoma rufum* (Linnaeus).—This bird is a common winter resident right down to the Gulf Coast. Many years ago I found them nesting to the Gulf Coast of Alabama and Mississippi. They, however, did not come west of the Mississippi River to the coast until 1937. One pair of birds nested that summer in a briar patch on my cattle range near Avery Island. Since that time

they have become more and more common as summer residents, and now are well established as summer nesters.

SOUTHERN ROBIN, *Turdus migratorius achrusterus* (Batchelder).—The Southern Robins first nested in the coast area of Louisiana, so far as my observation is concerned, about ten years ago. Now they are found in very sparing numbers as summer-nesting residents. They prefer the open, scattered clumps of timber, preferably around homesteads, for their nesting places.

WOOD THRUSH, *Hylocichla mustelina* (Gmelin).—The first Wood Thrushes I observed nesting in the Gulf Coast area were in 1890. I considered it at that time an extremely rare summer bird. They are great singers, and as their voice is easily recognized, their location is made known without sight of the bird. There has been a gradual increase in the number of breeders in the Avery Island section until now they can be considered a common resident.

EASTERN BLUEBIRD, *Sialia sialis sialis* (Linnaeus).—When the prairie district of Louisiana, from Avery Island west, was in its primitive condition with only a small farm here and there, and the balance of the country was taken up by cattle ranges, the fencing around the few homesteads was of split cypress rails and posts, or lines of China trees or willows. In the cypress posts and in dead sections of China trees, Red-bellied Woodpeckers, *Centurus carolinus* (Linnaeus), and Red-headed Woodpeckers, *Melanerpes erythrocephalus* (Linnaeus), hollowed out their nesting places. These hollows, when not occupied by woodpeckers, were often used by Bluebirds for their nesting places. There were no trees on these prairies, except those about the houses and fields, and Bluebirds were found nesting everywhere throughout extreme south and southwestern prairie sections of Louisiana. The aspect of the country is changed now, as it is thickly covered with small farms, and the numerous fence lines around them have grown up into trees and brush until the whole country seems to be forest-covered. The Bluebirds have left completely. I have not seen a nesting pair for more than twenty-five years.

BLUE-GRAY GNATCATCHER, *Polioptila caerulea caerulea* (Linnaeus).—This little bird was a regular breeder in the extreme southern part of Louisiana, placing its nest either on the broad limb of a thorn tree or China tree. These trees grew commonly around the small farms, scattered over the prairie. Since the country has become thickly settled and fairly well covered with trees and underbrush, the Blue-Gray Gnatcatcher, as a nester, has disappeared.

LOGGERHEAD SHRIKE, *Lanius ludovicianus ludovicianus* Linnaeus.—It is only within recent times that the Loggerhead Shrike has been a summer resident and nested in the lower half of Louisiana. I recorded these shrikes as nesting near Mobile, Alabama, and Gulfport, Mississippi, in the springs of 1906 and 1907. They were totally absent west of the Mississippi River, as a summer resident, up to 1911 when one pair of the birds was found nesting near Houma, Louisiana. Since that time, their range has extended westward. They are now an extremely common summer resident all along the Louisiana coastal area, nesting in the isolated thickets and trees, mostly bordering fields and roads and near houses. The shrike recorded from southern Louisiana in earlier days evidently was the Migrant Shrike, *Lanius ludovicianus migrans* Palmer.

STARLING, *Sturnus vulgaris vulgaris* Linnaeus.—This bird first appeared as a winter visitor to southern Louisiana in November, 1924. It is now extremely abundant all winter, occurring in enormous flocks and destroying a great part of the berries and seeds that would be the natural winter food of many of our home birds wintering in Louisiana.

GREAT-TAILED GRACKLE, *Cassidix mexicanus mexicanus* (Gmelin).—My first record of this bird on the coast of Louisiana was in 1917. Since that time, a number of them have been taken in my banding trap, and definitely identified by Dr. Frank M. Chapman. The Great-tailed Grackle differs in coloration from the Boat-tailed Grackle, *Cassidix mexicanus major* (Vieillot), in that the male has a greenish cast to its plumage, while the Boat-tailed Grackle male has a bluish cast. The female of the Great-tailed Grackle is very much darker than the female of the Boat-tailed Grackle. These are distinguishing field marks when the birds are seen together, but better clues to identification are the whistling squeak of the Great-tailed Grackle male and the coarse *chuck* of the female. Their range seems to be extending farther eastward.

Avery Island
Louisiana

AN ASPECT OF COLLECTORS' TECHNIQUE

BY T. T. MCCABE

THE following notes are not written by a histologist or a physiologist and do not pretend to describe the phenomena to the limit of our knowledge of the organs or tissues involved or to discuss the functional significance or theories of chemical control of the changes which are described. A small introductory bibliography is added, though there is little enough literature to bridge the gap between the classroom specimen or slide and the life cycle of the wild bird or mammal. The ornithologist is interested in these matters not for the sake of histological or physiological knowledge *per se,* but as steps toward the precise record and definition of life histories for such purposes as inter-specific comparison and environmental correlation. This point of view is not easily understood by the technical specialist. As one of the few, and rather shamefaced, recent recruits to the disappearing fraternity of collectors, I, like everyone else, have been impressed with the limited utility of birdskins, and have tried to develop a rudimentary system of record for a few facts which can be saved even under field conditions. As long as a great quantity of material for exclusively systematic purposes is the prime requisite, such material, involving so large a waste of life, can be put to little further use.

It may be argued that these are matters which pertain to the histologist, and that to modern science ill-standardized and incomplete records are valueless. On the other hand such records are, for untold years, the only means by which the immense numbers of wild species are going to be brought under, or contribute to, the physiological theory which is the most likely to make sense out of the welter of taxonomic, distributional, and behavioristic facts. I do know that I have many series from which perfectly reliable life cycles can be built up, while the average museum series illustrates nothing but the molts.

As far as the notebook goes, of course, the record should be limited only by the collector's knowledge, time, and equipment. But a large part of what is suggested here should go straight onto the label and remain inseparable from the skin. A great proportion of the materials upon which vertebrate zoology will depend for generations has either been collected without systematic field records or has long been separated from them, and the future holds no special promise of improvement in this respect. The minimum record with the skin should define the state of the reproductive organs and the amount of fat,

with as many of the other suggested characters as possible. The point to remember is that everything is of interest that shows a *cyclic change.*

Adequate definition of the condition of the female organs is the least ambiguous indicator of the chronology of the reproductive period. The fledgling ovary, a vague whitish body, though probably of more or less constant form, is hard to measure by gross methods, and it is better for the collector merely to indicate its quality (color, firmness) and restrict his measurements to oocytes after they begin to reach a millimeter or over. At first the ovary is hardly more than two membranes, germinal epithelium and *tunica albuginea,* attached below by its hilus and enclosing quantities of microscopic oogonia, though occasional primary oocytes are present in a month or two, and many by fall. There seems to be, in temperate regions at least, an early winter period of practically no change. In later winter or early spring, growth of new layers of connective tissue, growth of follicle cells covering the oocytes, and advanced growth phases of the primary oocytes themselves slowly create the first visible changes which the collector can and ought to record. The ovary becomes firm and cremeous, with considerable depth, and opaque, with a visibly granular surface and minute but deep folds. Microscopically, yolk-vacuoles and soon yolk droplets appear peripherally, and the latter soon show visible color in the new, measurably large, pigmented oocytes, perhaps a month before laying in small birds. About this time or shortly after, an immense increase in growth rate of the oocytes occurs—an overnight rate-change in the hen has been shown to be 25.8-fold. Failing greater refinements, the stages can at least be recorded on the label as I have done, as "no dev.," "firm," "ova to 1 mm.," "ova to 3.5 mm., pig.," and finally "vasc." for the appearance of blood vessels on the follicle, even though the convenient little word *ova* is doubtfully correct at this stage. At least in the very few cases in which cytological investigation has been applied to wild species it is in the very large oocytes, about to leave the ovary, or even in the mouth of the duct, that the maturation divisions begin, resulting in the rapid stages called secondary oocytes, ootids, and finally mature ova (Durme, 1914).

At least two or three days before the oocyte leaves the follicle, or skin of follicular cells which surrounds it, there appears on the latter a broad white line, about a quarter the diameter in length, and free of blood-vessels, the cicatrix or attenuated stigma. This splits, and the ovum is pressed out into the filmy mouth of the duct, or infundibulum. These white lips help to distinguish the subsequent col-

lapsed, emptied follicles from the degenerating undischarged follicles, which are common, so that it is easy to tell with the naked eye or hand lens, during laying or for a very few days thereafter, the number of eggs which have been laid.

For the subsequent diminishing r[illegible] of "luteal cells" which persists for a time within the ovary, it h[illegible], for no very good reason, to be fashionable to use the term "cor[illegible]us luteus" owing to apparent lack of the secretory function of the homologous male body, yet no other term has been substituted. Considering other crimes of terminology in the same system, such as the name "seminal vessicles" for the profoundly distinct structures of birds and mammals, this is something of a quibble. The remnants of discharged follicles are soon indistinguishable from many others which degenerated fruitlessly—scar-like points in the ovarian mass. Their dwindling to complete absorption requires some six weeks or two months, but they are distinguishable to the eye or hand lens for less than a week. I make notes such as "*2 empty folls.; ripe folls. 7, 9, 10 mm.*" Presence of the small stages is no proof of breeding, as oocytes suffer atretic breakdown throug[illegible]ut the year.

As far as gross appearance goes, ovaries in early stages of retrogression are difficult to describe. Oocytes and follicles seem to degenerate at the time abundantly and variously. Many turn grayish or blackish, others strong yellow—hard, granular, often irregular in form, and isolated. I got into the habit of writing "ovary gravelly"—a senseless phrase, but one somehow suggestive and unmistakable to me. I have found the restoration of an apparently uniform, fresh-textured ovary, in songbirds, to take nearly two months from the last egg.

There seems to be a brief burst of activity of the germinal epithelium shortly after laying, which produces many oogonia, some of which grow into primary oocytes. The picture is believed to remain approximately stable during the rest of the summer, with some growth and breakdown of the already-present elements. The time and nature of winter reactivation probably differ greatly with species and climates; it has its place in the adaptive scheme, and will play a large part in the natural history of the future. Bullough with his British Starlings finds renewed growth-activity (not epithelial) from October to December, leading to abortive oocytes, but the production of new oogonia was suspended at least through the autumn. These details are all microscopic, but are given here because I have so often been puzzled by finding distinctly firm, enlarged ovaries long after

any possible breeding time, and suspect that late summer or early autumn activations of a temporary character not infrequently go to a grossly visible stage. Slowly through the winter, microscopic change takes place, such as vacuolation or the increase of follicular or other cells, but macroscopic change again waits until close to breeding-time as described for the first-year birds.

Among the most spectacular of the visible, cyclic changes is that of the oviduct (female Müllerian duct), which, from a straight, transparent, scarcely-visible thread in the fledgling, develops, shortly before first reproduction, into a huge, muscular, cream-colored or pinkish, convoluted tube which I have known to exceed the intestines in volume. In spite of continual changes in its tissue-layers through the summer, fall, and winter, the great change, as in the case of the oocytes, takes place within the month before laying. The change usually is first visible posteriorly. I note "duct dev. post.," or "duct. mod., large, or max." Within two or three weeks after the last egg, in small birds, there has been completed an equally rapid collapse. Complete regression, in appearance at least, is achieved in about six weeks. There is also a slight autumnal increase in length and thickness (Bullough, 1942), corresponding to that of the oviduct, and probably a subsequent period of stability until the approach of the next ovulation. It has been shown by various workers that the cyclic change is controlled by ovarian secretions (Domm, 1939).

Fertilization almost certainly takes place about the head of the duct (infundibulum), but presents no gross manifestation. In the hen at least, ova are believed to have survived in the oviduct so that fertile eggs have been laid at least three weeks after isolation from the cock. It is quite possible that the time of receptivity in the female may be long before actual ovulation, and it is probable that the elements of courtship and mating may, in wild birds which do not ordinarily ovulate without fertilization, have much to do with stimulating ovulation. In the hen it is thought to take about twenty-two hours from ovulaton to laying if the progress is continuous, but if the egg reaches the uterus late in the day it is usually held there over night. Of this period, about three hours are spent in the upper two-thirds or albumen-secreting part of the duct, about one hour in the isthmus or short section above the uterine enlargement, and about sixteen hours in the uterus and in the process of laying. The total time in the pigeon seems almost twice as long (Harper, 1904). It is probable that great variation will be found in different groups, perhaps in correlation with the length of the duct.

The whole period of these advanced developments is much shorter than the period of full development of the male testis, which approaches its maximum size while the oocytes of the females of the same population show relatively small development and differentiation. In regard to the testis, I am fully aware that the relation of size to function, of the external appearance of the gland to content and availability of sperms (spermia, spermatozoa), is a complex matter of which we know little. A long cytological history is concealed by very simple external changes. Certainly the development of interstitial cells, which have nothing directly to do with sperm production but which have been thought to be connected with the development of secondary sexual characters, has some effect on size. None the less, present evidence indicates direct correlation between volume and spermogenetic activity, though not between either one and abundance of interstitial cells (Bissonnette, 1930; Benoit, 1922, 1923). Simple measurements of length and breadth of the larger testis ("testis 9 x 5 mm.") make possible a fair calculation of volume.

The greatest of all the cyclic changes, judged by size alone, is found in the seminal vesicles, which terminate the *vasa deferentia* posteriorly. In some but not all small birds this forms a mass which distends the whole anal region. It has been convincingly shown to be hormone-controlled, and by no means the mere result of sperm-pressure (Riddle, 1927). On incision it is the grayish, pinkish, or 'pepper-and-salt' mass about the anus. Riddle has shown that while the oviduct undergoes a percentage increase of size of some thousand per cent, the seminal vesicle shows one of some two thousand, which is probably the greatest known cyclic change except that of the horns of deer. Bates (1927) attaches great importance to it for the field worker as a better indicator of actual breeding activity than the testes. "Large testes in the males, if accompanied also by a great knot of the coiled and tangled thread-like ducts called the *vasa deferentia,* near the vent, are evidence of breeding activity at the time. If the *vasa deferentia* are not noticeable, large testes alone are not very reliable evidence of breeding, just at the time; . . ." This has appeared to me to be true in some degree, but neither Riddle nor Bullough, who have followed the developments with great care, emphasize the greater narrowness of the maximum period of the seminal vesicles.

The epoophoron, or epididymis, has a visible change, but a very slight one, like that of the *vasa deferentia* proper. It is a narrow body adhering closely to the *vasa* as they leave the testes.

The graphs of these changes, properly related to the rest of the cycle

in both sexes, will be the medium by which technical theory regarding these organs, their secretions, their hormones, and their correlations will reach the practical problems of the life histories of the great masses of wild birds, which can themselves never be subjected to the intensive methods of the laboratory or the breeding-cage.

Testes which are dull green (starlings), dull blue (thrushes), or gray (certain ducks) should be noted. This is due to deposition of pigment between the tubules of the testis, not to disease or haemorrhage, and is sometimes visible for certain parts of the cycle, sometimes for all of it in varying degrees. Its significance is not known. Differences in size or position between the pairs of the testes are apt not to be fortuitous, but consistent in the species and the stage.

The assumption and loss of fat, especially (in our almost complete ignorance of the south-temperate region) by migrants which make long flights to and from the north, is a far more regular and significant phenomenon than is generally realized. I have always found that collectors who have not begun to work in the late winter or very early spring north of, say, 52° N. lat., have an inadequate idea of how much fat a bird may carry, as well as of the speed and regularity with which it is assumed and lost, as suggested, for instance, by the rarity of taking a really fat bird on its wintering grounds until the very end of its southern sojourn, the heavy fat of such migrants during the latter parts of their northward journeys, and its immediate loss upon arrival. That there is a cycle which is largely independent of such factors as better or poorer living is quite certain. I have no precise measure of degree of fatness and can imagine none applicable to field work, but the following verbal scale, which I have applied to a few thousand specimens, is a long way better than nothing: "no fat," "little fat," "mod. fat," "fat," "very fat," "excess. fat." I am often told that I cannot retain a consistent mental grasp of so many and such vague steps. On the contrary, I continually fight against the seeming necessity of interpolations. A more trenchant criticism would be that different groups cannot be made comparable. This is true, and is the chief reason for not using a measurement of the amount of fat at some definite point. A grebe or an auk which ought to be indicated as thin possesses a layer of fat which might make a collector accustomed to passerine birds place it two or three steps up the scale. I have no answer to this except to ask the hypothetical critic to suggest something better. In practice, I do make allowances for loons, grebes, and most pelagics, but do not draw distinctions between perching birds of different fat-carrying tendencies—that is,

I judge northern savannah sparrows, which perhaps top my personal list, by the same standards I apply to northern resident jays, kinglets, or chickadees which are seldom fat. Most ducks can become really thin and come under the system fairly well, though I do not claim that the designations would reflect comparable conditions of the birds, as compared to other groups, very precisely. It must be remembered that the indications cover sections on an imaginary ordinate, not absolute states. Thus, "no fat" does not mean that there may not be a light smear of yellow in the dorsal tract.

No fat.—Hardly more than a hint in the dorsal tract or about the pygostyle.

Little fat.—A substantial depth, perhaps a millimeter in a sparrow, in the dorsal tract. Some fat in the furcula.

Moderate fat.—Quite heavy in the tracts, with small plates elsewhere on the skin. Crotch of the furcula fairly well filled.

Fat.—Moderate sheets removable as such from many parts of the skin.

Very fat.—Considerable amounts of solid fat inside the abdominal cavity, filling in between the intestinal folds, but the latter not hidden or embedded.

Excessively fat.—Deep sheets of fat everywhere between skin and muscle, even over the back. Intestines solidly embedded and overlaid, hardly visible. I have found the easily detachable fat on newly arriving savannah sparrows and shrikes in the north to weigh as much as one-fifth of the weight of the bird.

This scale has been used and published by Blanchard (1941).

Another matter of interest, already mentioned in connection with the *vasa deferentia,* is the appearance of the vent, and this is of special interest to bird banders, as in the live bird it may reveal sex with fair certainty at an important time, as well as something of imminent or recent laying in the female or readiness to mate in the male. Not only in the male, but in both sexes, the surrounding tissues are apt to rise in a protuberance, definitely in a round column in the male, less certainly and in a less elevated, transversely oval mass in the female. The vent itself is more apt to show as a round orifice in the male, as a transverse slit in the female. The elevation in the female, when present, is probably due in large part to the crowding of the duct and the pressure of the heavy uterus.

There is no worse illustration of our failure to make use of opportunities or to learn anything of a bird's life from skin-collecting than our ignorance of the history and correlations of the brood-patch. The patch is by no means a mere removal of feathers, but an elaborate and deep-seated physiological process involving spectacular anatomical changes. The sequence of external manifestations would serve to reveal the condition of the bird and the stages of the hidden cycles with fair accuracy. The nature of the gradual baring of the skin, its as-

sumption of the heavy, pulpy, quality, the accumulation of underlying liquid, and the disappearance of all these characters ought to be recorded precisely.

Bernhard Lange's long paper on the subject (1928), while it does describe and illustrate the highly complex forms and locations of the patch in half a dozen types, is almostly entirely concerned with the involved changes in blood vessels, with difficult and far-fetched analogies, such as with the apparatus involved in mammillary developments in mammals, and with the highly complex histology of the skin changes.

In most of the smaller and higher forms, the process seems to be quite involuntary, though perhaps aided by wear. The presence of almost completely bare patches, though without full development otherwise, in some non-brooding passerine males, was apparently not realized by that superb student of pterylography, Christian Ludwig Nitzsch, who, unfortunately, wrote very little about the matter. There seems not to be much doubt that certain of the larger and lower forms, such as some ducks and geese, which use their own feathers in their nests, remove them, whether or not previously loosened, with their bills. To what extent this is true elsewhere we do not know. Personally, I have little doubt that it is true of loons and grebes which do not make use of the feathers. I have collected a Red-throated Loon which had just laid its eggs, with a small, uncompleted patch, bounded by feathers which showed neither special wear nor loosening, and I suspect that this bird tears out its feathers by force. Nitzsch says: "I have most certainly seen the two brood-spots ascribed by this writer [Faber] to the species of *Phalaropus* . . . and have convinced myself of the spontaneous shedding of the down-feathers at this spot. This may also be the case with the contour feathers, when these are wanting at the period of incubation, as in the owls (see that family). The birds may, however, in some cases pull out the feathers which have already become loose, and thus assist in the production of the brood spots."

Bibliography

General accounts of the reproductive systems:

1919. Lillie, F. R. The development of the chick: 9–31. (New York.)
1920. Patton, B. M. The early embryology of the chick: 10–22, 30–36. (Philadelphia.)
1930. Wieman, H. L. Introduction vertebrate embryology: 96–102. (New York.)
1939. Domm, L. V. *in* Allen, E. Sex and internal secretions: 227–327. (Baltimore.)

The female system:

1916. RIDDLE, O. Amer. Jour. of Physiol., 41: 387–396.
1929. ROWAN, W. Proc. Boston Soc. Nat. Hist., 39 (5): 151–208.
1936. BISSONNETTE, T. H. AND ZUJKO, A. J. Auk 53 (1): 31–50.

The male system:

1923. BENOIT, J. Comptes Rendus, Societé de Biologie, 88: 202–205, 205–207.
1929. ROWAN, W. (*loc. cit.*)
1930. BISSONNETTE, T. H. AND CHAPNINCK, M. H. Amer. Jour. Anat. 45: 307–343.

The cycle in sparrows:

1929. FOLEY, J. O. Anat. Record, 41: 367–371.
1941. BLANCHARD, B. D. The white-crowned sparrows (*Zonotrichia leucophrys*) of the Pacific seaboard: environment and annual cycle. Univ. Calif. Publ. Zool., 46 (1): 1–177.

The cycle in the starling:

1942. BULLOUGH, W. S. The reproductive cycles of the British and continental races of the starling. Trans. Royal Soc. of London, 580: 165–246.

The cycle in pigeons:

1904. HARPER, E. H. Amer. Journ. Anat., 3: 389–346.

The history of eggs:

1914. DURME, M. VAN. Nouvelles recherches sur la vitellogenèse des oeufs d'oiseaux aux stades d'accroissment, de maturation, de fecondation, et du debut de la segmentation. Arch. Biol. (Paris), 29.

The *vasa deferentia* and *seminal vesicles*:

1927. BATES, G. L. Ibis, (12) 3 (1): 6–7.
1927. RIDDLE, O. Anat. Record, 37: 1.

The brood-patch:

1928. LANGE, B. Die Brutflecke der Vögelkund die für sie wichtigen Hauteigentümlichkeiten. Gegenbauers Morphologisches Jahrbuch, 58: 601–712.

Berkeley
California

NOTES ON THE CHIMNEY SWIFT

BY C. BROOKE WORTH

FLIGHT

DURING the course of my banding work among Chimney Swifts (*Chaetura pelagica*) at Swarthmore College, I discovered three occupied chimneys on Beardsley Hall and made the following observations. These chimneys were closed at the top by large overhanging stone slabs, and the birds had to enter through 'windows' in the four sides of the chimneys. Inasmuch as swifts usually roost and nest in chimneys which are open at the top, it was necessary for these birds to modify their usual mode of entry.

The open-top chimney requires the following maneuvers for aërial ingress. The birds often circle over it in narrowing, descending spirals, as on the surface of an imaginary inverted cone. Arrived at the apex, just over the entrance to the chimney, they check the speed of their descent almost to zero, raise their wings to an angle of about forty-five degrees above the horizontal, and, holding them rather rigidly in this position, descend into the hole in an oscillating flutter, similar to the fall of a leaf or scrap of paper through a calm atmosphere. Sometimes the spiral part of the course is omitted, the birds flying directly over the chimney, checking speed, and then oscillating downwards at once.

Such a complicated evolution of flight would seem very difficult to modify for entry into a chimney opening at the side. It was accomplished, however, by the swifts' omitting the spiral part of the maneuver entirely and using the 'oscillating flutter' at the peak of an upward and forward movement. To clarify this statement, let me describe what happened.

The swifts flew several hundred yards from the building and then, turning, dashed rapidly toward it at a height only a few feet from the ground. At a suitable distance away, they almost ceased beating their wings but turned them upward so as to glide forward and upward in an arc whose convexity was toward the wall of the building. Of course their speed diminished rapidly both forward and upward but they gauged their progress so that at the peak of the rise (when, of course, all upward motion was lost) there was still a remnant of forward movement. At this point they turned sideways and oscillated in the customary manner, so that by 'lateral translation' they were carried almost horizontally into the chimney window. This maneuver was apparently more difficult to accomplish that that required for the open-top approach, and on windy evenings it was attended by many failures. Three or four attempts were sometimes made before some of the birds succeeded in arriving properly at the windows.

BEHAVIOR

I constructed traps of wire frames covered with mosquito netting, suitable for catching swifts in this type of chimney. After dusk I went onto the roof to put the traps in position. As I worked at each chimney, I heard the roosting birds make a loud 'clapping' noise with their wings. The sound would be made once—a single 'clap'—by each bird when I arrived at the chimney, and it was not repeated unless I made a particularly disturbing noise myself. It sounded as if each swift, clinging by feet and tail, raised its wings over its back and then brought them down sharply against the sides of the chimney.

Such a habit might conceivably have arisen as a warning signal—perhaps to communicate a sensed danger to other swifts in the same chimney or to the brooding female; but, judging by the effect it had on me, I should say that the clapping would be more effective in startling intruders, possibly frightening them away. For unless I had known that swifts were present, I could scarcely have suspected that this sound emanated from a bird; the single, sharp clap had no suggestion of the fluttering of a bird in it; though what else could have made such a noise I do not know. Thus the mystery must be complete to the prowling predator or silent, gliding owl.

It is possible that the noise is incidental to the swifts' seeking a lower stance in the chimney, more effectively to escape danger threatening at the top. They may loosen their hold and drop a few feet with wings outstretched; and, on grasping the wall again, they may involuntarily make the clapping sound in bringing their wings back to the clinging position. But if this be so, one would expect a slight, accompanying fluttering noise, and from its lack I judge that the clapping is produced at rest, voluntarily, and for some protective reason. It is not accompanied by any vocal sound or bill-snapping; except for the single clap of each bird, the chimney remains strangely silent.

On the following morning I found that one of my nets had been blown away by the wind; the swifts had flown from this chimney. Another net had been partially dislodged, providing a horizontal crack about two inches high and as wide as the chimney-window through which the birds might have escaped, but apparently the feat of squeezing through this aperture in flight, without the headway of normal flying speed, was more than this species of bird could accomplish, for the swifts were fluttering ineffectually in the net or clinging helplessly to its sides. In the latter position they seemed to have no scansorial ability, finding it necessary to fly in order to get from one point on the netting to another. They were easily tired by their fluttering and frequently came to rest, sometimes returning to the interior of the chimney to do so. When they did this I 'shooed' them out by lowering a block of wood into the chimney on a long string and then vigorously pulling the block up and down. They would usually flutter out with normal composure following such treatment. The Chimney Swift has been harassed by man so seldom that it does not share in the terror which permeates most wild creatures. Its reactions resemble more those of the tame inhabitants of isolated regions such as the Galapagos Islands, where man

is comparatively a newcomer and his deadly attributes have not yet become grafted upon the animals' comprehension.

It was now long past sunrise. Many swifts were abroad, circling low over Beardsley Hall and showing a mild degree of interest in the imprisoned birds. Now, at last, I heard an occasional twittering from the birds in the chimneys, though they still gave an infrequent 'clap' as I went about my work.

In my hands I found the swifts much more docile than are most captured birds. They became 'hypnotized' almost as soon as I picked them out of the nets, and almost invariably kept their eyes closed throughout the banding process. It was as if they had exhausted their whole repertoire of protective devices with their cavernous clappings and were now so totally overcome as to make no pretense of ferocity or intimidation whatsoever. Deprived of wing-power, with which they feared no living form of pursuit, they gave up wholly to defeat.

So completely convinced of their impending annihilation were they, that I was able to band several and lay them on their backs in a row, with their eyes still tightly closed, before one sensed its freedom and struggled into the air. The disturbance aroused the others, and they all quickly made off. As they sprang up, they made relatively slow progress for the first dozen wing-beats. Then, as they got more fully under way, the efficiency of their efforts suddenly increased and they zoomed off like bullets. It seemed to me that their wing structure was so designed that full mechanical advantage was realized only at high speeds. An analogy might be drawn to an automobile starting from rest in high gear, chugging at first, but suddenly 'taking hold' at about fifteen miles per hour and then shooting forward with great acceleration.

STRUCTURE

While the swifts were in my hands with their eyes closed, I had an opportunity to examine their remarkable eyelids. The eyes themselves are rather protuberant. This prominence is undoubtedly a convenience for a bird of pursuit and of rapid, doubling flight, and it is probably also a consequence of the development of a wide, gaping mouth, for this has displaced the adjacent structures of the head above it. But large protruding eyes in a bird such as a swift need more adequate protection than would be the case among less aërial species, and such a protective function is discharged by a modification of the lids. These are very large and loose; both the upper and lower ones are increased above the usual size. I was able easily

to push each one into the other's 'territory,' so that the entire eye was covered by a single lid, one or the other.

One can imagine that any object striking the swift's eye, even if the bird blinked in time, could do considerable damage to the eye because of the customary hurtling velocity of the swift's flight. But an oversized and very flexible pair of lids might serve to divert the object by causing it to roll over the convexity of the eye; and with either lid capable of complete extension over the entire eye, the object could be directed, or allowed to slide, across the shielded eyeball in any quadrant. Such eyelids would also make it difficult for stinging insects, upon which the swifts may feed, to inflict injuries on eyes.

There is a further protection to swifts' eyes which seems to be in excess of birds' ordinary equipment. I found that if I separated the eyelids, the eyes would often still be completely covered with a large nictitating membrane. This is the most highly developed membrane of its sort that I have seen. It appeared to be semi-transparent, but whether of use in flying, particularly during storms (when it would be thoroughly moistened externally), I cannot say. It is suggestive, however, to remember that swifts do not seek cover in advance of thunderstorms as most other birds do, but may be seen against the black clouds, darting about with incredible speed, apparently reveling in the high wind's provision for unusually keen sport.

A less anthropomorphic explanation of the swift's storm-flying would take account of W. H. Hudson's observations on the subject. In Argentina he noticed that various insects often take to the gale which sweeps ahead of a storm, apparently trying to outdistance the deluge which will beat them to the ground. This may be true of insects in our climes, and the Chimney Swift may be taking advantage of the particularly good hunting which it has learned to expect at such times. If so, the fact still remains that the swift, by virtue of its superior flying ability, is able to profit by a meteorological phenomenon which causes many birds to suspend their activities; and were it not for the possession of an exceptionally well-developed nictitating membrane, the swift, too, might have to seek shelter during storms to avoid catastrophe.

Swifts' legs and feet are always surprising to see and feel. When the birds are held in one's hand, their feet are clenched tightly and resemble the deformed fists of a paralytic. Their legs, small and weak, are covered with thin, pink skin and have a peculiar, fleshy appearance, due to the absence of scutes which give most birds' legs

a scaly or reptilian appearance. Because of this lack of armor they feel warm and soft, quite unlike the legs of any other birds I have handled.

FOOD

The swifts left their droppings in my mosquito-netting traps, and I afterwards examined these carefully for any light they might throw on the birds' diet. The droppings were of two sorts—a semi-liquid one which stained the nets, and a very dry solid one which I thought at first might be 'insect-castings' comparable to the pellets regurgitated by owls, hawks, and some other birds. But I was able to detect intestinal molding in the dry droppings, which designated them as being of fecal nature. Besides, there were no entire insect skeletons among them, as might have been expected in a casting; rather, they consisted of a great many flakes and fragments of desiccated and compressed chitin, so fine that it was not possible to identify any of the insects or even insect parts.

At the very center of one of these dry droppings I found a small pebble, smoothly rounded, measuring 2 x 1.5 x 1 mm. This surprised me greatly at first, for I could not imagine how a swift could obtain a stone. One knows of swifts' twig-gathering habits on the wing, but one can scarcely credit the bird with the ability to gather pebbles in the same way. Nor can one conceive of a swift alighting on the ground to pick up 'hen's teeth,' though it seems reasonable to suppose that gravel would be useful to the bird's crop in grinding the larger and more resistant insects. As I looked at the pebble, however, it came to me that it was of the sort which is commonly found in mortar such as is used in building brick chimneys, and I felt that I had hit upon the correct origin of the material. It was still a tax on the imagination, however, to picture the swift at roost in its chimney, pecking at the mortar with its most unwoodpecker-like bill. Perhaps it normally nibbles over a large area of the inside of the chimney for the sake of rare, loose sand-grains. It must be so; otherwise I cannot account for the 'pearl in the oyster.'

LONGEVITY

Among the swifts which I trapped on Beardsley Hall in 1937 there was one bearing a band which I had placed around its leg seven years before, in the spring of 1930. The bird was an adult at that time and was therefore at least a season old. Now, in the spring of 1937, that swift must have been at least eight years old. It looked just like any other swift, albeit it had carried its band, C-32705, into

its secret winter home seven times. Looking at this small bird—one of the 'lower animals,' I had a sense of being hopelessly and unutterably earth-bound.

Swarthmore College
Swarthmore, Pennsylvania

ORIENTAL FORMS OF THE PYGMY WOODPECKER

BY JAMES C. GREENWAY, JR.

THE gray-headed forms of the pygmy *Dryobates* (*D. canicapillus*) of the eastern Asiatic mainland form a complex analogous to a superspecies. The larger, darker birds inhabit China; the smaller and paler ones inhabit Burma, southern Siam, southern Annam and Cambodia. Within these two larger groups, which cannot be indicated by our trinomial system, there are many geographical races, all of which are more or less ill-defined, unsatisfactory forms. The Philippines, Sumatra and Borneo contain well differentiated insular subspecies. There are only five characters to be used for racial diagnosis. They are: (1) size, (2) relative amount of red on occiput of males, (3) relative number and size of spots on the upper tail coverts and central rectrices, (4) relative size of spots on secondaries, (5) relative color tone of body plumage (either black or brownish black above, with streaks below darker or paler).

This last character is subject to marked seasonal variations; birds taken in the months of April to September are, in general, paler and browner than those taken between September and May. But this seasonal variation is much more apparent in the southern forms than in the northern. The situation does not appear to be confused by any considerable post-mortem change; the darker forms of China have not become browner, less black, in museums.

Birds of the year can be identified by the first primary, the outer web of which is not attenuated at the tip. This feather is sometimes longer, but not always so. They sometimes have less well defined, rather darker, streaks below, but this character is obscured by seasonal variation, particularly in Malayan populations. The red occipital streaks which distinguish males appear in a nestling specimen.

In Malaya and perhaps Borneo this gray-headed species (*canicapillus*) breeds in the same localities as a considerably smaller, brown-headed form (*D. moluccensis moluccensis*), which I consider to be a geographical representative of the small, brown-headed forms of the Indian plains (*D. m. nanus, D. m. hardwickii,* etc.). *D. canicapillus*

and *D. nanus* are therefore not conspecific. In view of the fact that *D. m. nanus* of the Indian plains has a bare, crimson circumocular region whereas the slightly darker forms of Malaya, Java, Sumatra and Borneo have this region feathered, they may possibly be considered as distinct species. But in any case I do not think that the gray-headed *canicapillus* is conspecific with either group.

The application of names to the brown forms is a task of some difficulty and doubt, partly because the types are no longer extant and partly because there has been considerable inaccuracy in their identification. It is still an open question as to whether or not *Picus moluccensis* Gmelin is identifiable. The plate in Daubenton's 'Planches Enluminées,' no. 748, is very inaccurate. It lacks the white moustachial streak common to the whole group and is spotted below rather than streaked. But, on the whole, it could scarcely be anything but a female of this group, and though Stresemann (Arch. für Naturg., 87: 87, 1921) says of it: "Diese Grundlagen sind völlig unzureichend, um eine sichere Deutung des Gmelinschen Namens zu ermöglichen," it would seem considerably simpler to accept it. The type locality has been restricted to Malacca by Oberholser (Proc. Biol. Soc. Wash., 32: 7, 1919) and this restriction is followed by Chasen in his 'Handlist of Malaysian Birds': 145, 1935. Hargitt [Ibis (4) 6: 43, 1882] indicated that he was of the opinion that "Le Petit Pic des Moluques," figured by Daubenton, on which *Picus moluccensis* Gmelin was based, is the Javanese bird, and Riley (Proc. Biol. Soc. Wash., 40: 140, 1927), following him, restricted the type locality of this race to Java. However, until someone can find differences to separate these populations the question is of no great moment.

The theory that *moluccensis* and *auritus* are synonymous is indefensible, as I have pointed out below, for *auritus* is clearly described by Eyton as a gray-headed bird.

Of late years it has been the custom to use *Dryobates nanus* Vigors, 1831, as the specific name for the gray-headed forms (*canicapillus*). It is clear, nevertheless, that Vigors had a brown-headed form before him for he says: *"capitis fronte verticique brunneis."* He supposed that the bird came from the Himalayan Mountains, but since no such form has since been found there, it would appear to have been an error and it would be wise to follow Stresemann (l. c.) who restricted the type locality to Cawnpore in the plains. It is not possible that these small brown birds are conspecific with the large, gray-headed forms and therefore the name *hardwickii* cannot be used, for it applies to a subspecies of *nanus*. It is unfortunate that Vigors's name

pygmaeus, which clearly applies to the gray-headed bird of the Himalayas, is preoccupied.

I am at present unable to decide whether the comparatively distinct forms of the Philippines and those of Japan, which Hachisuka has lumped under the name *moluccensis,* are really conspecific.

I have sincerely to thank Dr. Ernst Mayr and the authorities of the American Museum of Natural History, Mr. R. M. deSchauensee and the Academy of Natural Sciences, and Mr. H. G. Deignan and the authorities of the U. S. National Museum, for the loan of valuable material and their advice.

Dryobates canicapillus doerriesi (Hargitt)

Iyngipicus doerriesi HARGITT, Ibis (4) 5: 398, 1881—Askold Id., Eastern Siberia.

This race is to be distinguished from all others by its large size. It differs from its neighbor, *scintilliceps,* in its average larger size and in having the white area of the rump less streaked with black.

RANGE.—Ussuri, Manchuria and Korea.

MATERIAL EXAMINED.—2 ♂, 2 ♀—Korea: Seoul, Songdo, Keikido (Oct., Dec., Jan., Feb.).

MEASUREMENTS.—Wing, ♂, 103, 106 mm.; ♀, 105, 113; (av., 106.7). Tail, ♂, 61; ♀, 61, 68; (av., 64.7). Bill, ♂, 20, 21; ♀, 20, 22; (av., 20.7).

Dryobates canicapillus scintilliceps (Swinhoe)

Picus scintilliceps SWINHOE, Ibis, 5: 96, 1863—Pekin, China.

Yungipicus pygmaeus clementii LATOUCHE Bull. Brit. Orn. Cl., 40: 51, 1919—Chang Yang Hsien, Hupeh.

This race differs from *nagamichii* LaTouche and *obscurus* LaTouche in being somewhat paler below with narrower black streaks.

Y. clementii LaTouche was described as intermediate between birds of north China and those of southeastern China, having the streaks of the under parts less heavy and the ground color of the under parts richer ochraceous brown. Eighty per cent of the seasonally comparable birds before me are, however, indistinguishable.

RANGE.—Chihli (Johol), Shantung, Kiangsu, and Chekiang.

MATERIAL EXAMINED.—11 ♂, 8 ♀—Chihli: Iyankow; Kiangsu: Chinkiang, Nanking; Shantung. 17 ♂, 9 ♀—Hupeh: Ichang, Chang Yang hsien (Jan., Feb., March, Oct., Dec.).

Dryobates canicapillus nagamichii (LaTouche)

Yungipicus scintilliceps nagamichii LATOUCHE, Bull. Brit. Orn. Cl., 53: 22, 1932—New name for *Yungipicus s. kurodai* LaTouche, Birds East China: 22, 1931—Fukien; *nec Dryobates leucotos kurodai* GOTZ, 1926.

As might be expected, this race is intermediate between *scintilliceps* and *obscurus*. It differs from the former in being more heavily streaked below as a rule. Only three specimens in a series of eighteen are not separable by this character. From *obscurus* it appears to differ in having a well-developed white collar, continuous, as a rule, though usually interrupted in *obscurus*.

Yen (Oiseau, Nouv. Ser., 3: 625, 1933) synonymizes this race with *omissus* Rothschild, a course which seems to me to be impossible. They differ by two characters. *Omissus* is darker and more heavily streaked below; the white nuchal collar is interrupted in *omissus*.

MEASUREMENTS.—*nagamichii:* wing, ♂, 100–102; ♀, 100–106; (av., 101.6). Tail, ♂, 59; ♀, 60–61; (av., 59.7).

"clementii" (Hupeh) = *scintilliceps:* wing, ♂, 95–104; ♀, 101–106; (av., 101.8). Tail, ♂, 51–60; ♀, 50–59; (av., 55.9).

scintilliceps: wing, ♂, 97–102; ♀, 97–105; (av., 100.5). Tail, ♂, 54–59; ♀, 50–59; (av., 55.8).

RANGE.—Fukien; recorded by Yen (l. c.) from central and western Yunnan, northern Kwangtung and "probably" southern Hunan and Kwangsi.

MATERIAL EXAMINED: 4 ♂, 6 ♀—Fukien: Kuang Tien, Min River, Ching Feng Ling, Hsia Yang; Kuatun (April, Nov., Dec.).

Dryobates canicapillus kaleënsis (Swinhoe)

Picus kaleënsis SWINHOE, Ibis, 5: 390, 1863—Formosa.

This race is close to *nagamichii* but differs in having the lower back and rump more heavily barred, which makes most specimens of *nagamichii* appear whiter. Seventy-nine per cent are distinguishable in series by this character. The wing and tail are slightly shorter.

RANGE.—Island of Formosa (Taiwan).

MATERIAL EXAMINED.—6 ♂, 5 ♀—Formosa: Bankoro, Sharaishika, Tapposha, Schoschang (Feb., March, April, November).

MEASUREMENTS.—Wing, ♂, 96–100; ♀, 95–101; (av., 98). Tail, ♂, 54–58; ♀, 52–58; (av., 54). Bill, ♂, 19–21; ♀, 21; (av., 20.8).

Dryobates canicapillus swinhoei (Hartert)

Iyngipicus scintilliceps swinhoei HARTERT, Novit. Zool., 17: 221, 1910—No-Tai, Hainan.

This race is smaller than *kaleënsis* and *tonkinensis* but is otherwise very close to both.

RANGE.—Hainan Island.

MATERIAL EXAMINED.—5 ♂, 6 ♀—Hainan Island: Lei Miu Mon, Mt. Wuchi, No-Tai, Tetsu.

MEASUREMENTS.—Wing, ♂, 92–96; ♀, 93–95; (av., 93.5). Tail, ♂, 45–52; ♀, 48–49; (av., 45.9). Bill, ♂, 19–20; ♀, 18–20; (av., 19).

Dryobates canicapillus omissus Rothschild

Dryobates pygmaeus omissus ROTHSCHILD, Bull. Brit. Orn. Cl., 43: 10, 1922—Lichiang Range.

Dryobates semicoronatus szetchuanensis RENSCH, Abh. u. Ber. Mus. Tierk. Volk. Dresden, 16: 39, 1923—Kwanhsien, Sechuan.

Dryobates pygmaeus permixtus LATOUCHE, Bull. Brit. Orn. Cl., 43: 44, 1922—Milati and Yunnan-Fu.

This race is characterized by its darker gray head, the large area of black on the occiput, large area of white inner secondaries and darker, more heavily streaked under parts.

Fortunately, *omissus* has priority over *permixtus* which was described from an area populated by intermediates, which are closer to *omissus* than to *obscurus*. Rothschild's statement (Nov. Zool., 33: 238, 1926) that this race is much larger than *obscurus* is not borne out by my measurements.

Rensch apparently did not have an opportunity to examine either of these races for he compared his birds only to *scintilliceps*. My short series is very close to *omissus*.

MEASUREMENTS.—*omissus:* wing, ♂, 99–105; ♀, 103–104; (av., 102.8). Tail, ♂, 50–56; ♀, 53–57; (av., 54). Bill, ♂, 19–20; ♀, 19–20; (av., 19.5).

"szetchuanensis": Wing, ♂, 100; ♀, 100. Tail, ♂, 54; ♀, 54. Bill, ♂, 20; ♀, 19.

RANGE.—Kansu (Kham), northern Sechuan, and northwestern Yunnan.

MATERIAL EXAMINED.—4 ♂, 6 ♀—northern Yunnan: Kopoatsun, Yunnan Fu, Yangtze "Big Bend," Likiang Range (Jan., Feb., May). 1 ♂, 1 ♀—Sechuan: Kwanhsien (May) (topotypes). 1 ♀—Kham: Chung Chang (Aug.).

Dryobates canicapillus obscurus La Touche

Dryobates canicapillus obscurus LATOUCHE, Bull. Brit. Orn. Cl., 42: 14, 1921—Hokow, S. E. Yunnan.

From *nagamichii* and *scintilliceps* this race differs in having the ground color of the under parts somewhat darker and the black streaks somewhat wider in seasonally comparable birds. Wing and tail are shorter. It is very close to *omissus* Rothschild, its northern neighbor, but differs in having a smaller black occipital area and shorter wing and tail on average, though there is much overlap. There is likewise, as a rule, less white on the lesser wing-coverts. Four

specimens, two of which are from Yunnan-Fu, are intermediate. Indeed, this is clearly an intermediate population and the wisdom of its recognition may be questioned.

MEASUREMENTS.—*scintilliceps:* wing, ♂, 98–102; ♀, 97–105; (av., 100.5). Tail, ♂, 54–59; ♀, 50–59; (av., 56.2).

obscurus: wing, ♂, 97–98; ♀, 95–104; (av., 97.5). Tail, ♂, 49–55; ♀, 51–55; (av., 52.5).

RANGE.—Southeastern Yunnan.

MATERIAL.—3 ♂, 4 ♀—southeastern Yunnan (Jan., Feb., March, April).

Dryobates canicapillus tonkinensis (Kuroda)

Yungipicus pygmaeus tonkinensis KURODA, Bull. Brit. Orn. Cl., 44: 47, 1924—Yen Bai, Tonkin.

This race is smaller than *obscurus* and there is no overlapping measurement in this small series. As a rule there is less white on the inner secondaries than in *obscurus;* only two specimens in a series of fifteen are indistinguishable by this character.

In his original description, Kuroda speaks of the Tonkinese population as having a few distinct white spots on the interscapular region. I cannot, however, discern this character.

MEASUREMENTS.—Wing, ♂, 97–98; ♀, 95–104; (av., 97.5). Tail, ♂, 49–55; ♀, 51–55; (av., 52.5).

RANGE.—Tonkin, northern Laos.

MATERIAL EXAMINED.—3 ♂, 5 ♀—Tonkin: Chapa; Laos: Muong Sovi, Phu Kobo (near Xieng Khouang), Taloun (near Luang Prabang).

Dryobates canicapillus semicoronatus (Malherbe)

Picus semicoronatus MALHERBE, Bull. Soc. d'Hist. Nat., Metz, 5: 21, 1848.—Himalayas.

Typical specimens of this race (those from Nepal and Sikkim) differ from all other races in having the occiput entirely red or almost entirely so. To be sure, certain specimens have the red area interrupted by black, but there is considerably more red than in the next race (*canicapillus*) with which it intergrades in the Naga Hills, Assam and Cachar. Specimens from this region have less red on the occiput than typical *semicoronatus* but more than in *canicapillus.* Specimens before me from Assam have the central rectrices pure black as in *semicoronatus* while six specimens of a series of ten from Cachar have the two central rectrices more or less spotted with white. They are exactly intermediate in this character as in that of the occiput.

Seasonal variation in this form is very marked. Specimens taken in December, January, and February are darker and browner, not

as grayish, below than those taken in March and April. It is probable that there is likewise considerable individual variation, since a single specimen, taken in July, is also very brown below.

Stresemann (Arch. f. Naturg., 87: 85, 1921) apparently considers this to be a distinct species and calls the intermediates of the Khasia Hills "bastarde."

RANGE.—Sikkim, Bhutan (Kinnear), eastern Assam. All birds from south of the Brahmaputra examined by me are *semicoronatus* ≷ *canicapillus*.

MATERIAL EXAMINED.—4 ♂, 4 ♀—Sikkim. 3 ♂, 3 ♀—northwestern Assam, Cachar, Gunjong. 1 ♂, 1 ♀—northern Bengal. 1 ♂, 2 ♀—"Assam" are intermediate.

Dryobates canicapillus mitchellii (Malherbe)

Picus mitchellii MALHERBE, Rev. et Mag. Zool., (3) 1: 531, 1849—Nepal.
Picus pygmaeus VIGORS, Proc. Zool. Soc., London, 1: 44, 1831 (not *P. pygmaeus* LICHTENSTEIN, 1823).
Yungipicus nanus nanus of authors, not of VIGORS.

According to Baker (Faun. Brit. Ind., 4: 50, 1927) this form differs from *omissus* in being paler and smaller; from *canicapillus* in having black central rectrices. I have seen no specimens but there can be no doubt that this is the gray-headed bird of the Himalayas and that Vigors's type was a pale brown bird of the plains.

RANGE.—Nepal.

Dryobates canicapillus canicapillus (Blyth)

Picus canicapillus BLYTH, Journ. Roy. Asiat. Soc. Bengal, 14: 197, 1845—Arrakan.
Iyngipicus pumilus HARGITT, Ibis, (4) 5: 599, 1881—Maliwon, S. Tenasserim.

The characters in this group are so obscured by individual and seasonal variation that an attempt at diagnosis of geographical races can meet with only relative success. From the large, dark populations of China this group differs in being smaller and paler. Birds of northern Siam are larger and blacker than those of lower Burma (typical *canicapillus*) but differ from *obscurus* by their smaller size and also by the fact that a considerable number (seven of the series of twelve) have the central rectrices spotted with white. These are intermediate, but in size are referable to *canicapillus*. Birds of the Tɔok Plateau (about 16° N. Lat., 99° E. Long.), which I assume are typical *canicapillus*, are browner above, even when birds of the same season are compared. Birds from Mt. Victoria, Chin Hills, are perhaps slightly darker and average a little larger, but I do not think they should be described. In Peninsular Siam, birds may be said to be

intermediate, since six of the series of twelve have the central rectrices unspotted and the others have one or two irregular spots instead of the regularly spotted, almost barred, tail of *canicapillus*.

This population may be called *pumilus* Hargitt if one prefers to recognize an ill-defined, intermediate group. Deignan (Journ. Siam Soc. Nat. Hist., Suppl., 11, no. 2: 123, 1938) has revived this name for it because of its browner coloration. I cannot find that, when compared season for season, they are appreciably browner than birds from northern Tenasserim. Ticehurst (Journ. Bombay Nat. Hist. Soc., 41: 592, 1940) says: "In Burma brownness and blackness is due partly to individual variation and partly to wear . . . The race *pumilus* seems very doubtful." They may be called *canicapillus* ≷ *auritus* if it is desirable to differentiate them.

RANGE.—Central Burma (Chin Hills) south and east to northern Siam (Chieng Dao, etc.) and south through central Siam to northern Malaya; southern Annam. If *delacouri* is not recognized, the range will include eastern Siam and Cambodia.

MATERIAL EXAMINED.—5 ♂, 3 ♀—Burma: Mt. Victoria, Chin Hills (Feb., March). 4 ♂, 11 ♀—northern Siam: Cheng Dao, Doi Dao, Doi Soutep, Me Rampan (Jan., March, Sept., Dec.). 2 ♂, 2 ♀—northern Tenasserim: Taok Plateau, Lakya and vicinity (Feb.). Western central Siam: 2 ♂, 1 ♀—Susaivat (July). 4 ♂, 10 ♀—southern Annam; vicinity of Dalat and Fimnon.

MEASUREMENTS.—Mt. Victoria: wing, ♂, 83–87; ♀, 84–90; (av., 86.4). Tail, ♂, 34–42; ♀, 40–41; (av., 39). Bill, ♂, 15–17; ♀, 16–19; (av., 16.5).

N. Tenasserim, Pegu Yomas (1): wing, ♂, 82–87; ♀, 77–88; (av., 82.8). Tail, ♂, 36–39; ♀, 36–39; (av., 37.2). Bill, ♂, 17–19; ♀, 16–20; (av., 17.4).

N. Siam: wing, ♂, 81–84; ♀, 83–93; (av., 84.5). Tail, ♂, 34–40; ♀, 38–46; (av., 39.1). Bill, ♂, 16–17; ♀, 16–19; (av., 16.8).

Peninsular Siam—*"pumilus":* wing, ♂, 77–84; ♀, 81–85; (av., 82.3). Tail, ♂, 31–36; ♀, 35–37; (av., 34.4). Bill, ♂, 17–18; ♀, 16–19; (av., 17.3).

Southern Annam: wing, ♂, 85–89; ♀, 88–91; (av., 88). Tail, ♂, 35–39; ♀, 37–45; (av., 36.3). Bill, ♂, 17–19; ♀, 17–19; (av., 18.1).

? Dryobates canicapillus delacouri deSchauensee

Dryobates hardwickii delacouri DE SCHAUENSEE, Proc. Acad. Nat. Sci. Phila., 40: 110, 1938—Ubol-Chanuman, eastern Siam.

In the dry areas of eastern Siam and perhaps Cambodia there are populations which, in series, are somewhat paler brown above, with

wider, paler and less well-defined streaks below. This is true when either summer or winter birds are compared with skins in seasonally comparable plumage. They differ from birds of the higher portions of southern Annam by their smaller size and paler coloration, but resemble them in having the streaking of the under parts pale and ill-defined.

I recognize this subspecies with some doubt, for it may be questioned whether the paleness of this form is truly a genotypical character. Furthermore, unless the bird of Annam be described, the range of *canicapillus* is discontinuous, but I am unwilling to describe it because of its similarity to birds of northern Siam.

RANGE.—Eastern-central and eastern Siam.

MATERIAL EXAMINED.—5 ♂, 11 ♀—eastern-central and eastern Siam: Watha, Sriacha, Ubol, Kulu, Kha Sabab, Ubol Chanuman, Muek Lek, Chantuk, Pak Chong (Jan., Feb., May, June, July, Oct.).

MEASUREMENTS.—(eastern Siam): wing, ♂, 80–85; ♀, 79–84; (av., 81). Tail, ♂, 34–39; ♀, 34–36; (av., 33.9). Bill, ♂, 17–18; ♀, 17–18; (av., 17.4).

Dryobates canicapillus auritus (Eyton)

Tripsurus auritus EYTON, Ann. Mag. Nat. Hist., (1) 16: 229, 1845—Malacca.

This form, though it is very close to *canicapillus,* differs by having the central rectrices, as a rule, unspotted. Four specimens of a series of five have black central rectrices. Of a series of nineteen birds representing both races, four cannot be diagnosed. Of a series of twelve birds from the area of intermediacy in Peninsular Siam and southern Tenasserim, six have more or less spotted rectrices. However, instead of three well-defined white spots (almost bars) as in *canicapillus,* birds from Malaya have one or two small, ill-defined marks, when any mark is present. In series it appears that the area of black on the occiput is greater in *auritus,* but individuals cannot be thus diagnosed.

Eyton, in his original description, characterized this bird thus: *"fronte verticique cinereis brunneis leviter tinctis,"* which would lead one to think that *auritus* must be the gray-headed bird; but, on the other hand, Hargitt (Ibis, ser. 4, 6: 244, 1882) examined the type in the British Museum and says, *"pileo sepiario brunneo,"* and further remarks that it does not differ from birds of Sumatra, Java, and Borneo. We have two choices: either Eyton's original description is inaccurate or Hargitt mistook Eyton's type. Stresemann (Arch. f. Naturg., 87: 87, 1921) has accepted Hargitt's dictum, but Chasen (Bull. Raffles Mus., no. 11: 145, 1935) seems to have believed it to

be the gray-headed form. The situation is, however, confused, for Chasen has listed *auritus* as a subspecies of *hardwickii*, itself a brown-headed form.

In my opinion, neither Eyton nor anyone else could have described the brown-headed bird as having the *"fronte verticique cinereis,"* and I believe that Hargitt was mistaken in his choice of the type.

RANGE.—Malay Peninsula from Trengam on the east coast and, perhaps, the vicinity of the Siamese border on the west, south to Singapore.

MATERIAL EXAMINED.—2 ♂, 3 ♀—Malay: Trangunu, Tanjong Dungun; Perak Temerloh, Sungei Lebeh; Johore, Tanjong Silantei (Jan., May, July, Sept.).

Dryobates canicapillus volzi Stresemann

Dryobates canicapillus volzi STRESEMANN, Verh. Orn. Gesellsch. Bayern, 14: 288, 1920—Laut Tamar = Lake Takengon, N. W. Sumatra.

From all others (except *aurantiiventris*) this race differs sharply by its golden-brown under parts. The ground color of the back is black and the central rectrices are unspotted. ***D. c. aurantiiventris*** Salvadori of Borneo has the ground color of the breast and belly deeper orange and is somewhat less heavily streaked below. The bill is shorter.

RANGE.—Mountains of northwestern Sumatra (3000–9300 ft.).

MATERIAL EXAMINED.—3 ♂, 3 ♂—northwestern Sumatra: Blangnanga (3600 ft.); Mt. Löser (9300 ft.).

MEASUREMENTS.—wing, ♂, 78–82; ♀, 82–86; (av., 82.3). Tail, ♂, 36–39; ♀, 34–40; (av., 33.9). Bill, ♂, 14–16; ♀, 16–17; (av., 16).

Dryobates canicapillus aurantiiventris (Salvadori)

Picus (Baeopipo) aurantiiventris SALVADORI, Atti R. Accad. Sci. Torino, 3: 524, 1868—Borneo = Sarawak.

Like *volzi*, this is a very distinct insular race. It differs from all others in its deep orange under parts.

Chasen (Bull. Raffles Mus., Singapore, no. 11: 145, 1935) lists *Iyngipicus picatus* Hargitt (Ibis, ser. 4, 6: 41, 1882—northwestern Borneo) as a synonym but with a note to the effect that Kuroda lists this form from northeastern Borneo. Chasen says: "There is just a possibility that this is a good race with a very limited range."

RANGE.—Northern and eastern Borneo.

MATERIAL EXAMINED.—1 ♂—Sarawak.

Dryobates obscurior Rothschild

Dryobates obscurior ROTHSCHILD, Bull. Brit. Orn. Cl., 43: 10, 1922—Lichiang Range, N. W. Yunnan.

Hartert (Nov. Zool., 32: 147, 1925) says: "This peculiar bird is known only from the type specimen. It is very peculiar, the crown to the base of the upper bill nearly black, underside heavily striped. I am not sure about its relationship."

Hartert and Steinbacher (Vögel pal. Fauna, Ergänzungsband, 4: 374, 1935) says: ". . . das man für ein melanistiches stück halten möchte, doch hebt der Autor den schlankeren und spitzeren Schnabel noch besonders hervor."

Museum of Comparative Zoölogy
Cambridge, Massachusetts

FACTORS IN THE INCUBATION BEHAVIOR OF THE COMMON TERN[1]

BY NELSON MARSHALL

THE publications of Watson (1908) and Lashley (1915) contributed, among other things, an initial demonstration of the use of the egg, nest, and nest locality as subjects for controlled experiments on incubation behavior. Since their work on the Noddy and Sooty Terns, *Anous stolidus* and *Sterna fuscata,* respectively, many recent studies have centered on the relation of such factors to the incubation instinct. Though much of this research has been confined to members of the family Laridae, the accumulation of knowledge has not enabled the formation of generalizations applying throughout. Species differences occur within this family, as is clearly illustrated in the discussion by Noble and Lehrman (1940).

One might suggest that comparable experimental results of much greater value would be available if certain techniques were adopted as standards. The triangle test evolved by Kirkman (1937), working on the Black-headed Gull, *Larus ridibundus,* in which the eggs, the nest, and the nest site were offered as alternatives to the adult, is an example of a test worthy of repetition where possible. In practice, however, specific differences with respect to behavior and habitat often prevent such duplication. My program of experimentation on the Common Tern, *Sterna hirundo hirundo,* was greatly influenced by the methods of others, but the final program could not be planned till various techniques were actually tried in the field.

The research to be discussed was conducted from the F. T. Stone Laboratory of Ohio State University, Put-In-Bay, Ohio. Dr. C. F. Walker of the Laboratory staff has contributed with help and suggestions which have added greatly to the progress of the work.

[1] Contribution from the F. T. Stone Laboratory of Ohio State University.

Colonies located on nearby islands, particularly Starve Island, were used for observations. Starve Island is located in the western end of Lake Erie, approximately one-quarter mile southwest of South Bass Island. The island is composed almost entirely of solid rock with limited stretches of large, loose gravel and with little vegetation. In 1939 the work was spread over late June and early July. Continued study during late May and early June, 1940, enabled me to check conclusions reached during the previous year and to attempt additional experiments suggested by the 1939 results.

Color banding was considered as a means of distinguishing experimental birds. The method would have limited the number of birds that could be observed. Also, I have noted that these short-legged birds tend to obscure color bands when near the nest. It was discovered, however, that when observing from short distances, it is possible to distinguish birds by minute individual differences in color pattern. Throughout my experiments such distinctions were used with considerable success. Observations were made from a canvas blind and 8-power binoculars were used.

Recognition of the Nest Complement

The first set of experiments to be discussed involves the individual bird's ability to recognize the number of eggs present in its nest. The method merely consists of temporarily adding a desired number of eggs taken from another nest, or removing a desired number of eggs without emptying the nest. Frequently the experiments were run

TABLE 1

Experiments Involving Alteration of Number of Eggs in Nest (Sequence of Trials Is Indicated by Numbers in Parentheses)

Individual bird	*No. of eggs in nest*	*No. of eggs added*	*No. of eggs subtracted*
A	1	(1) 1; (2) 2; (3) 3; (4) 4	
B	3		(1) 1; (2) 2
C	3	(1) 1	(2) 2
D	1	2	
E	3	(1) 1	(2) 2
F	2	(1) 1	(2) 1
G	4	(2) 1*	(1) 3
H	4		(1) 3, (2) 1*
I	2	(1) 1	(2) 1
J	3		2
K	3	2	
L	3		2
M	3		1
N	3	1	

A–J trials were made in late June and early July, 1939; K–O, late May, 1940. G and H attended the same nest. Results were uniform; the adults incubated the altered number.

* The nest contained only 3 eggs when this experiment was made.

in pairs; the eggs that were subtracted from one nest were added to another. Table 1 gives an account of the results. It shows that eggs were added to a total of nine different nests involving nine different birds. They were removed from a total of nine different nests, involving ten different birds; two adults were tried on one of the nests. Though there was a frequent short and varied period of adjustment to the new situation, in all such cases the attending adult incubated quite normally.

Additional experiments involved emptying the nests and also replacing the eggs by an equal number of egg-shaped rocks. The results, shown in Table 2, reveal that under both these experimental

TABLE 2

BEHAVIOR OF ADULT COMMON TERNS AT EMPTIED NESTS AND AT NESTS WITH EGGS REPLACED BY ROCKS. (SEQUENCE OF TRIALS IS INDICATED BY THE NUMBERS IN PARENTHESES)

Individual bird	*No. of eggs in nest*	*Nest emptied*	*Eggs replaced by equal number of egg-shaped rocks*
A	1	(2) Settled on nest	(1) Settled on rocks
B	3	Failed to settle	
C	3		Failed to settle
D	1	(1) Settled on nest	(2) Settled on rocks
E	3		Failed to settle
F	2	(1) Failed to settle	(2) Failed to settle
G	4	(2) Settled on nest but restless	(1) Failed to settle
I	2	(1) Settled on nest	(2) Settled on rocks
J	3	Failed to settle	
N	3	Settled on nest	
O	3	Failed to settle	

A–J trials made in late June and early July, 1939; N and O, late May, 1940.

conditions some birds actually attended their nests as though incubating, while others did not. If of value for no other reason, these responses suggest the existence of individual differences and possibly, to some extent, sexual differences, phases of tern behavior to be discussed below.

Normal nest attendance was thus observed in all cases of decrease or increase in the number of eggs present except when the nest was emptied completely. Several trials were run long enough to establish the bird's attendance for over ten minutes, but it might be questioned that this constitutes normal attendance. As a check, fifteen nests known, by observations from the blind, to be attended were subjected to a variety of rearrangements in egg content involving increase, decrease, and exchange of eggs. Two days later I observed these nests from the blind and noted that they were attended, with the following two exceptions: the only one that had been emptied completely, and the only one in which a rock had been substituted for the single

egg present. In the remaining thirteen nests the terns had accepted the altered complement of eggs.

The trials show that a Common Tern is not markedly disturbed by an alteration of the number of eggs in its nest and will attempt to incubate all eggs present. In considering situations where this might have some bearing on the nesting behavior, the following circumstances and probable behavior are described:

(1) A Common Tern will not forsake its nest when an egg is broken or removed by a predator. On occasions I have seen attending terns removing pieces of broken eggs from their nests.

(2) It is not unusual for a misplaced egg to be left a short distance outside a nest for a prolonged period, then later be rolled into the nest. The rolling of such an egg, likely as not addled by the time it is rolled, is probably done by one adult. The mate, however, will not forsake the nest because of the addition.

(3) It is quite possible, as can be seen from experiments described below, that a tern might roll a foreign egg (misplaced from a nearby nest) into its own nest. If such an egg were more advanced than the original-nest eggs, its hatching might alter the adult's nesting behavior and prevent proper incubation of the younger eggs.

(4) Should another adult, behaving abnormally, lay an egg in a foreign nest, attendance at this nest would not be interrupted. Such a parasitic egg would probably receive improper attention unless it hatched with, or soon after, the other eggs of the nest.

The first two of the above conditions are known to exist. As to the third, Marples and Marples (1934: 185, 186) described an experiment in which two nests of three eggs each were moved till they were 18 inches apart. One pair of adults took possession of all eggs by rolling the neighboring three over into their own nest. A nest of six eggs I once observed at Middle Island, Ontario, may have resulted from a similar situation in nature. The fourth condition described above remains theoretical.

Egg Rolling and Egg Recognition

Common Terns have a definite tendency to roll their eggs when these become displaced from the nest, either by a natural accident or by the hand of an experimenter. The avian egg-rolling behavior involved is essentially like that described by Lashley (1915) for the Sooty Tern, and by Tinbergen (1934) for the Arctic Tern, *Sterna paradisaea*. An adult, after it has returned to the nest, may notice such a displaced egg. It may then walk toward the egg, but sometimes it turns back and makes several partial approaches before reaching it. When it can reach the outside egg with its beak, it stops and rolls the egg under its body. Since the bird is almost invariably facing away from the nest, eggs are thus rolled closer to the nest

each time this complex reaction is completed. No evidence of implicit behavior can be detected. To learn more concerning the factors involved in egg-rolling by the Common Tern, experiments were devised as described below.

One type of trial involved placing the entire set of eggs six inches outside the nest, the measurement being taken from the center of the nest in all experiments. Trials were continued, for varying periods of time, until the adults exhibited some definite reaction toward either their nests or eggs. These reactions are recorded in the third column in Table 3. The experiments were carried out on a total of sixteen different nests involving eighteen different birds, since on two of the

TABLE 3

EGG ROLLING EXPERIMENTS ON THE COMMON TERN WITH AND WITHOUT A COMPLETE SET OF EGGS IN NEST. (SEQUENCE OF TRIALS IS INDICATED BY NUMBERS IN PARENTHESES)

Individual bird	*No. of eggs comprising nest complement*	*Nest eggs placed 6 inches outside*	*Nest eggs placed 6 inches outside; substitute eggs placed in nest*	*Substitute eggs placed 6 inches outside; nest eggs left in place*
I	2	(1) Stood near nest		
II	2	(1) Settled on nest	(2) Incubated at nest	
III	1	(1) Incubated egg (2) Rolled egg		
IV	1	(1) Rolled egg (2) Settled on nest	(3) Incubated at nest	
V	1	(1) Settled on nest (2) Settled on nest	(3) Incubated at nest	
VI	3	(1) Settled on nest (2) Settled on nest	(3) Incubated at nest	
VII	3	(1) Rolled eggs (2) Rolled eggs	(3) Rolled eggs (4) Rolled eggs	(5) Rolled eggs
VIII	1	(1) Rolled egg (2) Rolled egg	(3) Incubated at nest (4) Rolled egg	(5) Rolled egg
IX	2	(1) Rolled eggs		
X	4	(1) Rolled eggs		
XI	4		(2) Incubated at nest	(1) Incubated at nest
XII	2	(1) Rolled eggs	(3) Incubated at nest*	(2) Incubated at nest
XIII	2	(1) Settled on nest		(2) Incubated at nest
XIV	2	(1) Rolled eggs	(2) Incubated at nest	
XV	2	(1) Rolled eggs	(3) Incubated at nest	(2) Incubated at nest
XVI	1	(1) Rolled egg		(2) Rolled egg
XVII	3	(1) Rolled eggs		(2) Rolled eggs**
XVIII	3	(1) Attended eggs—after attempting to roll them		
XIX	3	(1) Rolled eggs		(2) Incubated at nest or rolled eggs
XX	3			(1) Incubated at nest
XXI	3			(1) Rolled eggs

I–XVII trials made in late June and early July, 1939; XVIII–XXI, late May, 1940.
} Brackets indicate adults attending the same nest.
* The nest complement consisted of 1 egg when this experiment was made.
** The nest complement consisted of 2 eggs when this experiment was made.

nests both the attending adults were the subjects of tests. In one instance the adult merely stood near its nest. In two trials the adults, after first going to the nest, incubated the eggs in the changed locations. However, the behavior of these two adults differed markedly; whereas bird III incubated without any attempt to accomplish an easy roll into the nest (it did roll its egg when tested two days later), bird XVIII tried in vain to roll its eggs over a rough surface before commencing to incubate them. In seven trials the adult did not roll the outside eggs but settled in the empty nest as though incubating. Actual rolling occurred in fourteen, the majority of trials.

In a second type of experiment, the nest eggs were placed six inches outside the nest and substitute eggs were placed in the nest. As in the first type, the trials were conducted until definite reactions were displayed and these results are recorded in the fourth column of Table 3. The experiments involved a total of twelve different nests and twelve different birds. In nine trials the adult incubated the eggs in the nest, but did not roll the outside eggs. In three trials the adult not only incubated the eggs in the nest but also rolled the outside eggs toward the nest.

A third type of experiment involved leaving the nest eggs in place and putting an equal number of eggs (taken from another nest) six inches outside. The fifth column in Table 3 indicates reactions displayed by the adults in trials conducted as described above. The experiments involved a total of eleven different nests and eleven different birds. In five trials the birds incubated the nest eggs but did not roll the additional eggs toward the nest. In five trials the birds not only incubated the nest eggs but rolled the additional eggs from outside. It will be noted that in experimenting with the bird labeled XIX it was not possible to tell whether the bird would roll the outside eggs. It made preliminary gestures at rolling and then hesitated at length. Fear that rolling the eggs over rough terrain might result in breakage caused me to discontinue the trial after eight minutes.

It is possible that learning might influence the reactions of a bird subjected to more than one of these experiments. The results shown in Table 3, where the sequence of trials is given, yield only negative information as to the effect of the learning process and possible modifications due to learning cannot be detected.

In this demonstration of egg rolling, the existence of marked variations is brought to attention again, as in the last of the experiments involving the nest complement. Kirkman (1937) has discussed egg

rolling as a test of individual capacity in the Black-headed Gull. He considers the variations exhibited as being based primarily on differences in innate capacity. The variations I have recorded in egg-rolling experiments on the tern are also very suggestive of individual differences in innate capacity. It seems necessary, however, to consider other factors which might contribute to variation in behavior. Such factors are:

(a) The extreme irregularity of the island surface is such that the task of rolling eggs, or even seeing them, differs. This variable would have less significance on habitats of smoother surface.

(b) The proximity of other nests is a probable factor that has been mentioned by Palmer (1941).

(c) The direction a bird approaches the nest and sits on it, once it has arrived, affects the possibilities of this bird being attracted by an egg outside the nest. It seems probable that such a cause for variation would be effective in other species; however, in such birds as the Sooty Tern where the existence of a definite path of approach to the nest has been established (Lashley 1915), such error might be counteracted.

(d) No data are available as to the stage in the nesting cycle and the state of other physiological factors. Such an objection would seem to apply to Kirkman's interpretations as well.

(e) As in most Laridae, the sex of the adult Common Tern cannot be detected in the field. Some differences in behavior may be partially or wholly associated with the sex of the birds.

Noble and Lehrman (1940) discuss the fact that the retrieving action toward displaced eggs is greater in the case of birds sitting on empty nests. Palmer (1941) writes as follows: " . . . it may be said that Common Terns roll eggs farther to empty nests than to those containing part of a clutch." This generalization, though apparently based on observations, is not accompanied by experimental data. In my egg-rolling experiments, the birds rolled eggs in fourteen out of twenty-four experiments, or 58% of the trials when the nest was empty, but in experiments in which the nest was not empty, the birds rolled eggs in nine (one of which is questionable) out of twenty-three, or roughly 40%, of the trials. It thus seemed worth while to design experiments for a further analysis of this question. In doing so, nests were selected having three eggs, the predominant nest complement for the Common Tern, and situated on comparatively open, smooth terrain where variables in the difficulty of rolling would be minimized. First, all three eggs were placed twelve inches from the center of the nest. Next, one egg was placed twelve inches outside and two were left in the nest. If anything, the bird's experience from rolling three eggs would tend to lessen the time required to attempt rolling the one egg in the trial that followed.

In the following descriptions of the experiments (Table 4), the time indicated was recorded from the moment the bird first alighted

TABLE 4

EGG ROLLING OF THE COMMON TERN IN COMPLETELY AND PARTIALLY EMPTIED NESTS

Individual bird	*Three eggs 12 inches outside*	*One egg 12 inches outside, two eggs in nest*
1	Bird started to roll eggs in 2 minutes.	Bird flew three times on general alarm flights during the 14 minutes under observation and on three occasions it approached the outside egg but did not roll it.
2	In about 2 minutes bird sat on outside eggs. Started to roll eggs 9 minutes after first alighting.	Bird was observed to incubate at nest quietly for 12 minutes with no noticeable expression of an interest in the outside egg.
3	Bird flew on two general alarm flights after first alighting but in 6 minutes it started to roll its eggs.	Bird flew on five general alarm flights during the 13 minutes under observation, but it incubated well when at nest with no noticeable expression of an interest in the outside egg.
4	Bird flew on one general alarm flight after first alighting but started to roll its eggs in 2 minutes.	After 6 minutes of incubating very quietly and facing in the direction of the outside egg, the bird went to the latter and rolled it.
5	Bird started to roll eggs in 3 minutes. One egg immediately rolled into nest and the bird incubated this, keeping its head turned away from the remaining outside eggs during the next 7 minutes it was observed.	Bird incubated on the nest, facing away from the direction of the outside egg for the 7 minutes it was under observation.

near the nest after the eggs had been arranged. In the left-hand column is a description of the bird's behavior when all its eggs were outside the nest; opposite that description is an account of the behavior of the same bird at the same nest when only one of its eggs was placed outside. In each trial the observations were continued long enough to note some distinctive behavior in comparison with the behavior exhibited in the contrasting experiment. Unfortunately, 'up-flights' (flights of general alarm involving many individuals) were frequent, but that is always true in the colony shortly after I enter my blind. Some of the experimental birds, however, remained at their nests during such up-flights, so I doubt that the rearrangement of eggs was the cause for alarm.

The conclusion is that an incubating Common Tern has a distinctly greater tendency to roll outside eggs when the nest is empty than when it is partially full. The results are quite in accord with the generalization made by Noble and Lehrman and with the behavior exhibited by the Arctic Tern in Tinbergen's (1934) experiments.

In their rolling performances, Common Terns respond as though

unable to recognize their own eggs. The fact that additional eggs were rolled into the nest, even though the full nest complement existed, greatly strengthens this view. It will be noted from Table 3 that the two birds known to roll their own eggs from outside when substitute eggs were in the nest also rolled additional eggs from outside when their own eggs were in the nest. Thus the experimental results are in accord with the generalization made by Tinbergen (1934) to the effect that investigators working with colonial birds are unanimously of the opinion that the birds do not recognize their own eggs. When we consider, however, that Johnson (1941) discovered an exception to this in the Atlantic Murre, *Uria aalge aalge,* it seems possible that we may be dealing with an indifference rather than a lack of recognition on the part of the majority of the birds studied.

A generalization made by Goethe (1939: 34) for the Laro-Limicolae states that the nest and nest site play a greater rôle than the egg itself. Noble and Lehrman (1940) designed experiments to evaluate the relative attraction of the nest, the site, and the eggs as each affected the incubating reaction of the Laughing Gull. They conclude as follows: "Broody Laughing Gulls are attracted by (a) the eggs, (b) the nest site, and (c) the nest. At short distances the attraction of the eggs is greatest, of the nest site less, and of the nest least. This order of attraction is different in species which build more elaborate nests." In discussing the observations of other workers, these authors demonstrate the existence of species differences within the family; so it is interesting to consider the attraction of these factors to the broody Common Tern.

From experiments involving moving the eggs of the Common Tern in excess of the maximum retrieving distance, Marples and Marples (1934) found that terns accepted their eggs in the new locality. The time required for such acceptance was greatly decreased when the nests were moved with the eggs. These authors conclude as follows: "It would seem, from these results, that a Tern will follow its eggs and that it is the eggs, as is proper, rather than the site of the nest which loom largest in the bird's affections."

The same authors conducted experiments in which the eggs were buried in the sand at the nest site, inevitably destroying the nest structure; yet the Common Terns found their nest locations and, in the majority of trials, uncovered their eggs. In the egg-rolling experiments that I conducted, the terns invariably went to the nest location first. Some of the nests involved were of elaborate structure and some were, in effect, structureless; furthermore, since adults were

repeatedly picking up sticks and dropping them in the direction of the nests, they must be considered as distinctly dynamic structures. Nevertheless, an approaching tern exhibited further reactions only after going onto the nest location. In view of these facts it seems logical to designate not the nest but the nest site as the source of attraction. This view is further supported by my experimentation on factors of recognition, discussed below.

It does not follow, however, that the nest site, which is first to attract the approaching adult, is necessarily the greatest source of attraction to an incubating tern. The nest and nest site would be abandoned if no eggs were available either in, or to be rolled in, for incubation. It thus seems difficult, with respect to the Common Tern, to isolate these factors and decide which has the greatest attraction.

RECOGNITION OF THE NEST

A fascinating topic in a colony of nesting birds is the question of nest recognition. Working on Starve Island on July 11, 1939, I attempted to confuse the birds by disturbing various distinctive aspects of the scenery close to their nests. In only one of seven such cases did the attending bird give evidence of being confused as to its nest site. In this instance a large clump of weeds was removed from next to the nest, and a board was shifted from the west to the east side of the nest. The bird involved failed to find its nest until the conditions were restored as well as possible. It is noteworthy that in one case I moved a flat stone block, with an area of approximately four square feet from a position close to one nest to a corresponding position near another nest 4 feet, 8 inches away. The attending bird (I was watching the one at the first nest mentioned) went to its nest without delay or evidence of confusion.

At a later date I experimented with six nests by moving all of the nest material six inches away from the nest site but leaving the eggs on the site. The birds involved went directly to their eggs and incubated well, and in only one trial the attending adult picked at the moved nest sticks.

On July 13, 1939, I had an opportunity to make comparable tests in a colony at Middle Island, Ontario, Canada. In contrast to the habitat at Starve Island, this colony was established on a long gravel bar, vegetation was practically absent, and in many cases only the debris present distinguished one stretch of the bar from another. At first I placed my blind in a region where there was considerable beach debris and where the surface consisted of rounded rocks about three inches in diameter. Here I experimented with two nests but failed

to confuse the adults. Later I placed the blind farther out on the gravel bar where there were nests situated on fine gravel with comparatively little debris about them. This was a favorable place to work, for there was little differentiation in the appearance of one small area from the next. Experiments were conducted as follows:

Nest F-1 contained two brownish eggs placed in a shallow cup in the fine gravel. Sticks were absent from the nest but a few "nest sticks" were noticed just to the north of it.

(A) The surroundings were altered by scraping gravel all about the nest, making an especially large hollow to the northeast and a mound of gravel to the north of the nest. The position of some small rocks was also altered. In three minutes the bird arrived and went directly to the nest.

(B) The nest surroundings were left as described under A. The eggs were replaced by two eggs of a light blue background color, and the bird's own eggs were placed in an artificially-made depression one yard to the west of the nest. In two minutes the bird came to the nest and incubated the foreign eggs.

(C) The proper eggs were returned to nest F-1 and the substitute eggs removed. The surroundings were left as altered under A, except that the nest sticks mentioned as being just north of the nest were moved about seventeen inches westward and the west side of the nest depression was leveled off. When the bird alighted from the west it went to the sticks first, but soon went to its eggs.

Nest F-2 contained three light-brown eggs, and was composed of considerable stick material. Two larger sticks were on each side of the nest but there was no other debris within four yards of the nest site.

(A) The sticks from the nest were placed about sixteen inches westward and the two small debris sticks mentioned were removed. The bird went to the nest in one minute and without hesitation.

(B) The nest sticks were left as placed in A. The two debris sticks which had been removed in A were then placed so that they had the same relation to the nest sticks as had existed before the latter were removed. In about one minute the bird alighted at the nest sticks. Then it went from the nest sticks to the eggs and back three times, after which it went to the eggs and incubated normally.

Nest F-3 contained two light-brownish eggs, one of which was cracked. I noted that the bird would alight at a point from which it approached its nest by going over a small log. The log almost undoubtedly prevented the bird from seeing the nest from the alighting place. A much larger log in the background was conspicuous as a landmark.

(A) The small log was moved about sixteen inches westward, thus making the nest visible from the alighting place. In four minutes the bird arrived and went directly to the nest without hesitation.

Nest F-4 contained three brown eggs. It was just west of the large log mentioned in F-3.

(A) The small log mentioned in F-3 was moved about sixteen inches farther to the west. This log then had the same relation to F-4 that it originally had to F-3. The bird came to its nest immediately.

Nest F-5 contained three light-brownish eggs located in a small depression in the gravel with small nest sticks around, but not in the center of, the nest depression.

(A) The nest sticks were moved about sixteen inches eastward. In one minute the bird came and incubated the eggs.

(B) Some debris, which had been lying with its closest end about a foot from the nest, was moved so that it regained its original relation to the moved nest sticks. In two minutes the bird returned to the nest and incubated the eggs.

(C) The eggs of nest F-5 were placed in the newly constructed nest (A and B). Within one minute the bird landed at the old nest site. It acted confused, flew off, and soon returned to a spot between the new nest and the old nest site. It went to the new nest, then to the nest site, then flew. It returned, alighted at the old nest site, walked to the new nest, and repeated walking back and forth. Soon another bird came and approached the new nest, but the first bird drove it off. This happened three times, with apparently the same intruder involved in each case. Then the first bird flew off, returned to the old nest site, then to the new nest, and was walking back and forth when I closed the experiment after six minutes of such observation.

Nest F-6 contained three light-brownish eggs, one of which was broken. The eggs were in a small gravel depression which had a few nest sticks about it. The nearest debris consisted of a small stick and a small block of two-by-four-inch timber, about twelve inches and sixteen inches away, respectively.

(A) The nest sticks were moved about sixteen inches to the northwest. The bird alighted in about one minute and proceeded to attend the eggs.

(B) In addition to the change made in A, I placed the stick and piece of timber so that they resumed their original relation to the moved nest sticks. The bird alighted to the westward and then went to the eggs. Soon it flew and alighted again, less to the westward than before, and went to the eggs. It soon flew again and returned well to the northwest. As it walked toward the eggs, it hesitated a while at the nest sticks and then walked to the eggs.

Two more nest recognition experiments were conducted on Starve Island, May 25, 1940. It was known from experience that pronounced changes would be necessary to confuse the adults in such well-marked surroundings as exist on Starve Island. In the following experiments outstanding changes were made with this in mind.

Nest L-2 contained three brownish eggs and was of average size. Most conspicuous landmarks were a ten-foot, three-by-four-inch timber situated thirty inches east of the nest, and half of a barrel about five feet away.

(A) The 'three-by-four' was moved so that it lay close to the eastern edge of the nest; the barrel was covered with a blue sweater. The bird was confused to the extent of sometimes entering another nest, but in four minutes it incubated its own eggs normally.

Nest L-3 contained three light-brownish eggs and was of average size. It was conspicuous for the accumulation of debris about it.

(A) I cleared the surroundings of debris which consisted of a short 'two-by-four' timber, a plank, a few small boards, a broken baseball bat, and a rusty can. The bird alighted and went directly to its nest.

A patently subjective method has been used in the above experiments. Since nest recognition undoubtedly involves some learned behavior, variables, such as the amount of time a tern has attended the nest and the bird's familiarity with natural changes in the vicinity,

probably affected the experimental results. There are, however, certain general observations to be made from these trials. The terns were more easily confused by rearrangement of nest surroundings in the relatively uniform gravel bar of Middle Island than in the highly differentiated terrain of Starve Island. This leads to an analysis of the experiments conducted on Middle Island.

In F-5 experiment C, the bird found its nest and eggs arranged quite normally, but this new nest arrangement was sixteen inches away from the original nest site. The bird apparently retained, by means of some gross landmarks, a recognition of its old nest site, but by minor landmarks it recognized the newly constructed one. The eggs, as objects to be incubated, must have added greatly to the attraction of the new nest site, but in the short time allowed, the bird did not settle on them. In nest F-1 experiment B, the bird's eggs were placed in a newly made nest a yard from the original nest site, but substitute eggs were in the original nest site and these were readily accepted.

Nest F-6 experiment B, illustrates quite clearly the relation between larger and smaller landmarks in nest recognition. With the nest sticks and the surrounding debris moved sixteen inches to the northwest, we note that the bird alighted farther to the westward as it approached. It seems apparent that the nest sticks and the debris influenced this. On noting that the bird paused at the nest sticks between its alighting place and the nest, it seems highly probable that the nest sticks alone effected this pause.

Studies have not proven conclusively that any birds fail to recognize their own eggs, but it has been repeatedly proven that many colony-nesting birds act indifferent to such recognition if, perhaps, it does exist. Quite likely, Common Terns have a brief memory of the number of eggs in their nest, but the stimulus for incubation is effective when the number has been altered. It has also been stated that in all my experiments in which eggs were placed outside the nest, the bird returned to its nest site before reacting to the disturbed nest conditions. With these facts and the above nest recognition experiments in mind, it appears that a given locality is the object of recognition. This locality consists of eggs; often a depression in the sand, gravel, or even in the rock; often a variable amount of sticks under and about the eggs; and all surrounding landmarks from the small pieces of debris nearby to such things as large trees or rocks or the distance to the water. There is no evidence that any one of these things has any greater significance as a constituent in the recog-

nition of this locality than the simple part it plays in composing the landscape.

SUMMARY

Reduction of or addition to the number of eggs existing in a Common Tern nest does not alter the normal attendance of the adults, if at least one egg remains.

Some Common Terns will roll eggs into their nests when the latter are empty. Some will roll their own eggs into their nests even if a normal complement of substitute eggs has been placed there; moreover, terns are known to roll additional eggs into their nests even if their own eggs are in normal position. Great variation exists in egg-rolling performances. Possible causes for such variation are mentioned; however, these appear complex and have not been fully analyzed.

The tendency to roll displaced eggs is strongest when all the eggs have been removed from the nest.

The nest site, rather than the nest itself or the eggs, exerts the initial attraction to the broody Common Tern as it alights in the colony.

Responses of the Common Tern show that it either fails to recognize its own eggs or acts indifferently to such recognition. The total appearance of the locale is used by an approaching tern in finding its eggs. The eggs, the nest, and the immediate and the more distant landmarks are the constituents of this landscape, and it is merely as such constituents that each serves in 'nest recognition.'

REFERENCES CITED

GOETHE, F.
1939. Die Vogelinsel Mellum. Abhandl. aus dem Gebiet der Vogelkunde, Nr. 4: 1–110.

JOHNSON, R. A.
1941. Nesting behavior of the Atlantic Murre. Auk, 58 (2): 153–163.

KIRKMAN, F. B.
1937. Bird behaviour. A contribution based chiefly on a study of the Black-headed Gull. (London and Edinburgh.)

LASHLEY, K. S.
1915. Notes on the nesting activities of the Noddy and Sooty Terns. Pap. Dep. Marine Biol., Carnegie Inst., Washington, 7: 61–83.

MARPLES, G., AND MARPLES, A.
1934. Sea Terns or Sea Swallows. Their habits, language, arrival and departure. (London.)

NOBLE, G. K., AND LEHRMAN, D. S.
1940. Egg recognition by the Laughing Gull. Auk, 57 (1): 22–43.

PALMER, R. S.
1941. A behavior study of the Common Tern (*Sterna hirundo hirundo* L.). Proc. Bost. Soc. Nat. Hist., 42 (1): 1–119.

TINBERGEN, N.
1934. Enkele proeven over het ei als broedobject. Ardea, 23: 82–89.
WATSON, J. B.
1908. The behavior of Noddy and Sooty Terns. Pap. Dept. Marine Biol., Carnegie Inst., Washington, 2: 189-255.

Zoology Department
University of Connecticut
Storrs, Connecticut

GENERAL NOTES

Grasshoppers and crickets eaten by Utah birds.—Many species of Utah birds are decidedly insectivorous. Studies of a large number of stomachs from such birds have indicated that the vast majority of insects eaten were injurious. The following report is based on laboratory examinations of the contents of bird stomachs collected throughout Utah from 1935 to 1940, inclusive. Birds are definitely important in reducing insect populations, especially when insects occur in large numbers, as is the case in insect outbreaks. Assuming 2.5 birds per acre as an average for Utah (which is lower than many estimates would place the figure), an estimated population of 1°1,500,000 birds would exist in this state. Birds consume large amounts of food each day; they undoubtedly consume many billion injurious insects through the farm and range areas of Utah each year, with consequent benefit to farm crops, range forage and home gardens. While recognizing the benefits derived from the feeding of birds, it is difficult to estimate accurately the *degree of control* over a large area, which birds exert upon any particular insect pest. In general, the benefits derived from birds in the control of insects undoubtedly are many times the loss occasioned by the feeding of a few species which attack crops, fish or useful birds.

Brewster's Egret, *Egretta thula brewsteri*.—One stomach from a bird collected in the meadows at Logan, on September 6, 1940, contained twelve warrior grasshoppers, *Camnula pellucida*.

White-faced Glossy Ibis (*Plegadis guarauna*).—One specimen collected on meadows at Kanesville, July 23, 1940, contained two adult grasshoppers and one field cricket.

Western Red-tailed Hawk (*Buteo borealis calurus*).—Of seven stomachs examined, four contained Orthoptera, totaling 56 adult grasshoppers and one sand cricket.

Northern Red-shouldered Hawk (*Buteo lineatus lineatus*).—One specimen, collected at Elgin, Utah, September 28, 1939, contained five adult grasshoppers. This is an unusual record for Utah.

Swainson's Hawk (*Buteo swainsoni*).—Four of the ten stomachs examined contained 77 adult grasshoppers; one bird collected at Benson, July 31, 1940, contained 68 of these.

Desert Sparrow Hawk (*Falco sparverius phalaena*).—This is the most abundant hawk occurring in Utah, more than a hundred having been observed in one day of field study on several occasions. An examination of 197 stomachs showed 2,699 Orthoptera still recognizable, besides large amounts of well-digested fragments consisting chiefly of grasshopper parts; 2,417 grasshoppers were still recognizable in 185 stomachs; 231 field crickets were contained in 49 stomachs; and 50 sand crickets in eight stomachs; one katydid also was present. Grasshopper counts were based on caudal ends of abdomens as more of these were recognized than were heads or other parts. Evidently this bird takes the abdomen from many grasshoppers not entirely consumed, especially in areas where grasshoppers are abundant and easily captured.

Sage Grouse (*Centrocercus urophasianus*).—Three were collected in Mormon cricket areas; one contained 35 and another four Mormon cricket eggs; the other contained one sand cricket.

Ring-necked Pheasant (*Phasianus colchicus torquatus*).—Of ten examined, eight contained grasshoppers in either crop or gizzard, the total number being 13; one was a nymph.

Killdeer (*Oxyechus vociferus vociferus*).—Of five stomachs examined, two contained a total of five adult grasshoppers.

Western Willet (*Catoptrophorus semipalmatus inornatus*).—The one specimen collected contained one grasshopper.

California Gull (*Larus californicus*).—One specimen was taken on Tintic Mountain in 1940 in an area where from a few hundred to an estimated 2,000 gulls frequently were observed to congregate and feed upon Mormon crickets; the stomach of this specimen contained twelve mature Mormon crickets which constituted 100 per cent of the contained food. This stomach was very large and distended, filling most of the abdominal cavity of the bird.

Road-runner (*Geococcyx californianus*).—One specimen was collected at St. George on September 18, 1935; it contained three adult grasshoppers.

Burrowing Owl (*Speotyto cunicularia hypugaea*).—One specimen collected at Midvale, Utah, October 11, 1936, contained one grasshopper and one mouse.

Pacific Nighthawk (*Chordeiles minor hesperis*).—Four stomachs were examined; one contained nine winged grasshoppers, of which two were *Trimeritropus caeruleipennis*, two were *Disosteira carolina* and one *Melanoplus femur-rubrum*.

Lewis's Woodpecker (*Asyndesmus lewis*).—Of five stomachs examined, one contained an adult grasshopper.

Eastern Kingbird (*Tyrannus tyrannus*).—Fourteen stomachs were examined, eight of which contained nine adult grasshoppers.

Arkansas Kingbird (*Tyrannus verticalis*).—An examination of 55 stomachs revealed that 48 of them contained 110 grasshoppers, of which 105 were adult; six stomachs contained eight field crickets.

Say's Phoebe (*Sayornis saya*).—Four of the seven stomachs examined contained nine adult grasshoppers.

Western Wood Pewee (*Myiochanes richardsoni richardsoni*).—Two of the three stomachs examined each contained one adult grasshopper.

Desert Horned Lark (*Otocoris alpestris leucolaema*).—Examination of 62 stomachs showed eight to contain 16 Orthoptera, 14 adult and one nymphal grasshopper and one sand cricket.

Barn Swallow (*Hirundo erythrogaster*).—Fifty-four stomachs examined contained two recognizable field crickets and one snowy tree-cricket.

American Magpie (*Pica pica hudsonia*).—Only one of 16 juvenile magpie stomachs examined contained a grasshopper.

American Raven (*Corvus corax sinuatus*).—Often seen to feed upon Mormon crickets in Tooele and Juab Counties during recent years.

Rock Wren (*Salpinctes obsoletus obsoletus*).—Of the seventy-four stomachs examined, thirty contained 59 grasshopper adults and one nymph.

Western Mockingbird (*Mimus polyglottos leucopterus*).—Two stomachs contained one nymphal and four adult grasshoppers.

Catbird (*Dumetella carolinensis*).—One of two stomachs collected at Hooper contained two grasshoppers.

Sage Thrasher (*Oreoscoptes montanus*).—Thirty-nine stomachs were examined, thirty-two of which contained 61 adult and six nymphal grasshoppers and five field crickets.

Western Robin (*Turdus migratorius propinquus*).—Eleven stomachs yielded three adult grasshoppers and one field cricket.

Mountain Bluebird (*Sialia currucoides*).—One hundred and fifty stomachs examined contained 142 Orthoptera; 92 adult and seven nymphal grasshoppers were in 62 stomachs; 43 field crickets in 20 stomachs.

American Pipit (*Anthus spinoletta rubescens*).—Twenty-one of the 78 stomachs examined contained 36 Orthoptera, all field crickets.

Nevada Shrike (*Lanius ludovicianus nevadensis*).—Twenty-six stomachs were examined, 21 of which contained 55 adult and two nymphal grasshoppers, four field crickets and one sand cricket.

Western Meadowlark (*Sturnella neglecta*).—Forty-four of the 83 stomachs contained Orthoptera, 39 containing 73 adult and 6 nymphal grasshoppers; five field crickets and one sand cricket also were present in the additional five stomachs.

Yellow-headed Blackbird (*Xanthocephalus xanthocephalus*).—Two of the twelve stomachs collected contained three grasshoppers.

Thick-billed Redwing (*Agelaius phoeniceus fortis*).—Fifty-seven stomachs contained six grasshoppers in five stomachs and two field crickets in another.

Brewer's Blackbird (*Euphagus cyanocephalus cyanocephalus*).—One-hundred-five stomachs were examined; 40 contained Orthoptera, including 51 adult and 9 nymphal grasshoppers in 30 stomachs; the other ten stomachs held 16 field crickets.

Bullock's Oriole (*Icterus bullocki bullocki*).—One of the three stomachs examined held an adult grasshopper, another a nymph.

House Finch (*Carpodacus mexicanus frontalis*).—Of the 32 stomachs examined only one contained an Orthopteron, a grasshopper.

Western Vesper Sparrow (*Pooecetes gramineus confinis*).—Twenty of the 68 stomachs contained 32 adult and three nymphal grasshoppers. Several birds were collected while they still held a grasshopper in their beaks.

Western Lark Sparrow (*Chondestes grammacus strigatus*).—Fourteen of 17 stomachs examined held 28 adult and 6 nymphal grasshoppers.

Sage Sparrow (*Amphispiza nevadensis nevadensis*).—Of sixteen birds collected, one contained four grasshoppers.

Western Chipping Sparrow (*Spizella passerina arizonae*).—Of 207 stomachs examined, 15 contained Orthoptera, consisting of 15 adult and 5 nymphal grasshoppers and one field cricket.

White-crowned Sparrow (*Zonotrichia leucophrys leucophrys*).—One grasshopper nymph was the only Orthopteron in the 68 stomachs examined.

Gambel's Sparrow (*Zonotrichia leucophrys gambeli*).—Twenty-eight of the 92 stomachs examined contained a total of 37 Orthoptera, all adult grasshoppers.—G. F. Knowlton and F. C. Harmston, *Department of Entomology, Utah State Agricultural College, Logan, Utah.*

Altitudinal nesting and breeding-range extension of the Wood Thrush.—During the past two decades, the Wood Thrush (*Hylocichla mustelina*) has gradually extended its former breeding range northward into the upper reaches of the Green Mountains in Vermont and, perhaps, the White Mountains. Apparently escaping the notice of American ornithologists, these birds have definitely established themselves as regular summer residents in certain localities of northern Vermont where, twenty-two years ago, they were relatively unknown. And, strangely enough, the Wood Thrush has, in many cases, 'reversed the poles' and taken to altitudinal nesting in the more northern portions of its range, whereas it is decidedly of lowland distribution throughout the remainder of its domain.

During the latter weeks of June, 1942, I had the opportunity of studying the bird life in the region about Willoughby Lake, just south of Newport, Vermont, at the southern tip of Lake Memphremagog. I had prepared a list of 'probabilities' to be looked for in the region, in which the Wood Thrush was not included.

While canoeing on the lake one evening, I was indeed surprised to hear the Wood Thrush's song, intermingled with the vespers of Veeries and Olive-backs. The next day I investigated the matter without success; not a Wood Thrush could be found near the lake. Several days later, at an altitude of about 2000 feet on Mt. Pisgah, the song again was heard, and this time the search proved successful. Further investigation on this same mountain and other neighboring ones revealed four nests and some thirty individuals, all at an altitude of 1500 to 2500 feet!

The most unusual thing about the discovery of the birds was their apparent desire to remain aloof from civilization—their habit of preferring situations many hundreds of feet from the lake level, as contrasted with the definitely opposed preference of the Wood Thrushes found along most of the Atlantic seaboard. It would appear normal for a *northern* bird ranging *southward* to choose higher elevations to make up for the difference in latitude; why should the reverse be true? Possibly the prevalent juncos, White-throated Sparrows, waxwings, cuckoos, and other birds not commonly associated with more southern dooryards would not allow the intrusion of a species foreign to their established feeding ranges. Wendell P. Smith of Wells River, Vermont (MS.), suggests that the extension of range itself may have been caused by ". . . the replacement of the coniferous forest that covered so much of Vermont by hardwoods . . .", and perhaps this explanation in itself may answer the question of altitudinal nesting. Other observers have noted this peculiarity with respect to the species in Vermont. F. C. Lincoln tells of a record indicating altitudinal nesting on Kings Mountain near Ottawa, and another stating that the birds "nest mostly above 1200 feet elevation" [Endicott, N. Y.]. Mr. Smith (MS.) records seeing them " . . . on the slopes of Camel's Hump [Vermont] at an altitude of 1500 feet."

Wendell Smith's hypothesis regarding the replacement of conifers by deciduous trees as a contributing cause for the range extension seems the most likely answer to that question. The four nests which were discovered in June at Willoughby were all in groves of deciduous trees which supported relatively heavy growths of underbrush. No Wood Thrushes were found in the strictly coniferous areas, nor, as mentioned above, in the settled districts about the lake itself. Roger T. Peterson has suggested the possibility that the extension may have taken place by way of the St. Lawrence Valley, which would very likely result in a more or less restricted breeding locality somewhat to the north of the normal periphery of the former breeding range of the species, leaving a 'gap' in between where few, if any, Wood Thrushes would be found. Such is apparently not the case, as Vermont observers over the last twenty years have reported the birds becoming increasingly common in many localities between Willoughby and the latitude of central New Hampshire.

Mr. Smith tells me that while the birds are reported as "common summer residents" at Rutland by G. H. Ross, they are considered but "tolerably common" by Anna S. Reynolds at Burlington. Early Vermont writers all agree that north of its prescribed range the species was not very abundant prior to about 1910. Speaking of Wells River, Mr. Smith (MS.) writes: "It has been a regular summer resident in Wells River since 1925. Was first seen here in 1909 but absent during some of the seasons intervening between that year and 1925. It has become more numerous during the past five years."

The account given by Mr. Forbush, placing the northern limit as Mt. Mansfield, apparently is the only one which considers the birds' presence above central Ver-

mont as normal; Pearson (Birds of America, 1936) says "northern Ontario," yet follows with "*accidentally* to northeastern New York." Howell (Florida Bird Life, 1932) gives "southern Ontario, Vermont and New Hampshire," and Peterson (A Field Guide to the Birds, 1939) lists ". . . southeastern Ontario, and central New Hampshire south."

It appears natural for a given species to extend its range in one way or another over a period of years; the fact in connection with the present species's northward movement which should command the attention of ornithologists more than that is the habit of altitudinal nesting. Perhaps further research in connection with the Wood Thrush in northern New England would reveal additional interesting information relative to nesting localities which this species has chosen. It is altogether possible that this bird, being nowhere 'abundant' in the northern part of New England, has been overlooked in a great many places because of a lack of observers in the more inaccessible mountain regions. Too, its presence at Willoughby, but a few miles south of the Canadian border, gives rise to the possibility that the bird may be well established farther to the north, also in the higher altitudes, and well within the Dominion itself.

Assuming that competition from other species long-established in older stands of deciduous woodlands in the valleys and lowlands has proven too much for infiltrating Wood Thrushes to cope with, the metamorphosis from conifers to hardwoods would then become a factor in the altitudinal tendency of the species in the north, as well as the range extension itself. It could very well be that the thrushes moved in to the new growths of deciduous trees before too many other competitors had a chance to become established there themselves. One other possible explanation for the presence of the birds on the higher peaks might be that a subspecific difference exists between these birds and our well-established lowland Wood Thrushes which are known along the eastern seaboard. This statement, of course, must be made with the utmost care and only a suggestion; however, I have been unable to find reference anywhere to any species whatever which moves into higher altitudes as it moves *northward*. Bicknell's Thrush is an altitudinal breeder, but its range is well to the *south* of that of the Gray-cheeked Thrush, its somewhat larger counterpart. Similarly, the Sierra Hermit Thrush takes to the mountains to make its home, but at the same time it is considerably south of other Pacific hermit thrushes.

Whatever the motives behind this strange behavior of the Wood Thrush, the writer believes that its very presence in the higher Green Mountains well merits the attention of, and much additional research by, the ornithologists of the United States and Canada.—J. Charles Tracy, *1031 Wyoming Ave., Forty Fort, Pennsylvania.*

Wrens use duck down as nest lining.—A great variety of materials, both native and man-made, is used in lining the nests of many birds. The resourcefulness of the Long-billed Marsh Wren (*Telmatodytes palustris*) in utilizing the down feathers of ducks as nest lining was brought to my attention during waterfowl investigations in Iowa in 1938–1941. While making observations on the nesting habits of the Redhead (*Nyroca americana*) which nests among the sedges (*Carex* spp.) and bulrushes (*Scirpus* spp.) in good wren-nesting habitat, I saw a Long-billed Marsh Wren fly to its nest with a duck-down feather. Upon closer investigation I found the wren had lined its nest with Redhead-down feathers. Further search revealed the Redhead nest about fifteen yards away from the wren's nest. Thereafter, while passing through the marshes looking for Redhead nests, I took

the opportunity of observing the nest linings of about 250 wrens' nests, of which 75 to 80 per cent or more were dummy nests built by the males. By carefully probing with my fingers I was able to see the nest lining without visibly disturbing the nest or contents. In the nests which contained eggs, the lining of the nest extended along the tunnel-shaped entrance and often protruded from the nest opening.

The first wren nest containing Redhead-down feathers was found on May 15 and the last on July 1. A tottal of six wrens' nests, of approximately 250 examined, contained many Redhead down feathers. The wrens' nests profusely lined with down feathers averaged eight yards distance from the nearest Redhead nest. Other female wrens' nests, fifteen or more yards distant from those containing down feathers, were lined with other marsh-birds' feathers but not Redhead down. Frequently, single Redhead-down feathers were found in wrens' nests, probably wind-blown from the ducks' nests. Undoubtedly the wren's territory in which the Redhead nest was situated played the deciding rôle as to which wrens' nests were down-lined and which were not so lined.

The wrens made extensive use of other birds' feathers, noticeably Coot (*Fulica americana*) and Red-wing (*Agelaius phoeniceus*), with which to line their nests. W. Welter (The Wilson Bulletin, 47: 3–34, 1935, identified feathers of the Red-wing, Virginia Rail (*Rallus limicola*), American Bittern (*Botaurus lentiginosus*), pheasant (*Phasianus*), Ruffed Grouse (*Bonasa umbellus*), and domestic chicken in wrens' nests in New York. The variety of feathers and plant debris which line the females' nests in Iowa suggests that the wrens utilized the materials at hand, probably within their own nesting territories. There was no evident correlation noted between the nesting sites selected by the wrens and the sites selected by the Redhead or other species of ducks. However, the fact that six wrens' nests, representing about 25 per cent of the females' nests inspected, were lined with Redhead-down feathers to the exclusion of every other form of lining material, suggests a preference for the down feathers when they are available. The wind, aided by the wrens, was responsible for the gradual disappearance of so much of the down from the Redhead nests that by the hatching date very few of them contained down feathers.—Jessop B. Low, *Illinois State Natural History Survey, Urbana, Illinois.*

Unusual feeding habit of grackles and crows.—That crows would avidly consume fish scraps, is perhaps not particularly surprising because these birds are rather omnivorous feeders. Purple Grackles (*Quiscalus q. quiscula*) also use a wide variety of foods, and we have occasionally observed them feeding in shallow water on stranded insects and even small fishes. To see several dozens of these birds feeding in deep and turbulent water after the manner of gulls and terns, however, was indeed a surprise.

On March 9, 1943, the writer, in company with J. Clark Salyer, William P. Baldwin, and Donald V. Gray of the Fish and Wildlife Service, was at the site of the new power plant at the outlet of newly constructed Pinopolis Reservoir, some 35 miles northwest of Charleston, South Carolina. About 12,000 cubic feet of water per second was passing through the electric turbines, 'boiling up' to form the headwater of the Cooper River. Apparently the turbines were cutting up or otherwise killing large numbers of gizzard shad and other small fishes. These, brought to the surface by the churning water, attracted Ring-billed, Herring, Laughing, and Bonaparte's Gulls, as well as crows, Purple Grackles, and even a solitary Red-wing. Several dozen cormorants were active in the first mile of the

river, and as many Black and Turkey Vultures lined the banks to secure such morsels of food as were washed ashore. The grackles and crows fed over the turbulent water, picking up morsels of food with the skill and dexterity of the typical water birds. The feet and even the breast feathers of many of the crows and grackles were seen to touch the surface of the water momentarily as the birds hovered over this (for them) uncharacteristic feeding place.—CLARENCE COTTAM, *U. S. Fish and Wildlife Service, Chicago, Illinois.*

Winter insect food of chickadees.—It was recently my good fortune to add to the records of the former Biological Survey the nymphs of two species of insects which are devoured in countless numbers each winter. While making studies in forest ornithology I often pass through open spaces thickly overgrown by sumac of several species. In these openings I had noted Black-capped Chickadees (*Penthestes a. atricapillus*) and several other birds feeding on sumac berries and insect life found within the fruit clusters. But on two specis of sumac, *Rhus glabra* (smooth sumac) and *Rhus copallina* (dwarf sumac), I noted that chickadees spent much time picking minute objects from the bark of the stems at many points between the ground and the seed clusters. Examining the birds with close-up glasses, they could be seen eating black specks from *R. glabra* and less conspicuous brown specks from *P. copallina*. With a hand lens it was plain that the two types of scale-like organisms must be different species, as the black ones were differently sculptured and were fringed by a larger number of marginal setae than the brown ones, and that each was found only on its particular species of sumac. I shaved off thin slices of bark with the nymphs attached and sent them to Dr. Muesebeck, in charge of insect identification of the U. S. Dept. Agriculture, and he passed them to Dr. Oman who recognized them as the winter stage of "jumping plant lice," family Psyllidae. The black nymph was that of *Calophya flavida;* the smaller brown one, that of *C. nigripennis,* these being the only species of *Calophya* known to occur in the eastern United States.

In May, I was able to watch the very different and active adult insects emerge from their respective, sedentary nymphal forms which, however, began to crawl around a little before this metamorphosis. Then, indeed, they took on a very different form. The wings of *nigripennis* were very pale at first, soon turning black, while those of *flavida* remained yellowish.

Writing of the matter to Dr. Phoebe Knappen, of the Fish and Wildlife Service, she kindly added these species to the list of insects eaten by chickadees, as they did not appear in the records. Dr. Knappen informed me, however, that in 1927, T. T. Odell published a bulletin in Geneva, N. Y., on "The Food Habits of Orchard Birds with Special Reference to the Pear Psylla." As a result of his studies, Odell found that the Black-capped Chickadee is the most important single bird enemy of Psyllidae in that region.

My own observations show that in winters in which the *Calophyae,* which we may here call sumac psyllids, are very abundant, the chickadees consume enormous numbers of the nymphs of the two species.—RALPH E. DANFORTH, *Noank, Conn.*

Migrant Gray-cheeked Thrushes in song.—During the exceptionally rainy spring of 1943 when bird song seemed somewhat scarce, I was fortunate twice in hearing the song of the Gray-cheeked Thrush (*Hylocichla minima*), a bird which I have always hesitated to list from sight alone. On the first occasion, about eight in the evening of May 11, I was attracted to the bird by its call which was not

familiar to me, and, although I did not have my binocular with me, I was able to approach the apple tree in which it perched and see readily that it was a thrush of the Olive-back type. While I watched, it began to sing and I recognized at once the song of the Gray-cheeked Thrush, recalling the description of the song I had read. In some fifteen years of birding, I have found Olive-backed Thrushes (*Hylocichla ustulata*) singing in migration nearly every year, frequently in our yard, and am also familiar with the song of the Veery (*Hylocichla fuscescens*), a summer resident of this territory. This song resembled both, but differed from the pattern of either. It was soft—some notes almost whispered and seemingly coming from a great distance. In a few minutes the bird dropped to the ground where it sang a low song almost constantly as it fed. There were some lower, rather harsh notes, not thrush-like but more like those interspersed in the Catbird's song. I was under the impression at the time that this was probably not the song in its full glory—that it was not so inspiring as the Veery's song which it resembled the most. The bird sang in the rain as long as I remained to listen.

On May 19 I heard the second Gray-cheeked Thrush, this one, too, singing as long as I cared to listen. When I first heard the song, about six in the morning, it echoed from the stone walls of a vault in a cemetery here, giving these beautiful notes an unusual resonance. Rhododendrons surrounding the vault prevented my seeing the bird then as it sang. The song was shorter than the first bird's, had a more definite pattern, and was louder. It contained several notes similar to the beautiful 'double' flute-like notes of the Hermit Thrush (*Hylocichla guttata*), which I have heard twice during migration, and a few notes that reminded me of a Robin (*Turdus migratorius*). While the general impression was that of a song on a descending scale, yet a portion of it was not. I regret that I cannot put into words an adequate picture of the song.

The thrush ceased its song as I approached the vault, but as I remained quiet it commenced again, softer this time—more like the first bird's. This time I watched it sing through my binocular as it perched in a tree on the hill above the vault. It was still singing when I left the scene. During the entire time spent listening to the Gray-cheek, an Olive-back sang no more than sixty feet away. There seems to have been a good migration of Olive-backs through here this spring, and probably there were also more Gray-cheeks.—ROBERT E. BALL, *2622 Tuscarawas St. W., Canton, Ohio.*

Cowbird behavior.—An observer in the rice fields of Texas marvels most, perhaps, at one phenomenon—the immense flocks of Cowbirds that are continually wheeling and settling over the fields. Yet of all the teeming millions, not one ever built a nest, hatched an egg, or fed a fledgling. All began life as doorstep babies cared for by many different species. The mystery is that these babies should depart from their varied rearing, and flock together with birds of their own kind. Why?

Three observations I have made suggest an answer. Several years ago I caught a young Cowbird which a male Cardinal had been feeding about the house for several days. I liberated the captive on a large screened porch, where the Cardinal paid it two or three indifferent visits, and came no more, but an adult female Cowbird began visiting the young bird. At first she would call from flowering quince a few feet away. The spirited response of the captive to her was very different from the begging response to the foster-father. Later, she would come closer, and alight on the screen or hop along the protruding floor of the porch

where nothing but the wire separated her from the young bird. Then she would fly away, calling as if coaxing it to follow, and repeat this performance over and over. A male Cowbird lingered in the vicinity and showed interest but never came closer than the flowering quince. After a few days I freed the captive in the old birds' absence. Shortly afterward, however, I saw the young bird and the adult female together. For a week or two the young bird would fly away out of sight with the adult, but would return alone for two meals daily from my hand. Finally, on a Fourth of July, it failed to return.

Some years later (June 5, 1938) I observed a pair of Parula Warblers feeding a Cowbird fledgling. On June 12, at the same place, I heard a commotion above me, and saw three Cowbirds actively flying about in a large tree. A Parula Warbler in a nearby tree appeared interested and was much excited. After one or two minutes, the three Cowbirds flew away together in a confused manner.

A few days later (June 18) I heard a similar commotion in a tree. A male Cardinal and three Cowbirds (a male, a female, and an immature bird) were flying excitedly from limb to limb over and through the tree. The Cardinal was much agitated. Soon he flew to some vine-covered elders about thirty feet away. The three others came after him in a close group, but turned abruptly before they reached the elders, and alighted in an elm. Then they started again for the elders, missed them, gained elevation, and alighted in a hackberry tree, a hundred feet in the opposite direction. They soon flew again, with the male bird just behind the other two, as he had been in the previous flight. After some zigzagging, it which it seemed that the middle bird was trying to get away from the others, the three passed on out of sight.

It would be interesting to know how the old birds induced the young one to accompany them and if they could have recognized it as their offspring if, indeed, it was their own.—A. K. McKay, *Cove, Texas.*

Cooper's Hawk carrying a nest of young Goldfinches (*Plate 14, right figure*).—The following observation of an unusual feeding behavior of a Cooper's Hawk (*Accipiter cooperi*) was made at the Rose Lake Wildlife Experiment Station in Clinton County, Michigan. On the afternoon of August 25, 1942, a brood of eight half-grown Ring-necked Pheasants was flushed in a field of idle ground. An adult Cooper's Hawk, which apparently was but a few feet from the pheasants, flushed with them. Expecting to find evidences of a pheasant kill, a search was conducted over the site. Instead of the expected pheasant kill, however, a songbird nest and the scant remains of several nestling young were found. Portions of the viscera were still moist and unclotted blood was noted which indicated that the kill was very recent. The construction of the nest, lateness of the brood, and feather remains showed quite conclusively that the nest and young were of the Eastern Goldfinch (*Spinus tristis tristis*).

In the immediate vicinity of where the nest was found, the sand flat was largely barren and the few scattered plants were mostly horseweed (*Erigeron canadensis*), goldenrod (*Solidago altissima*), and ragweed (*Ambrosia artemisiifolia*). The nearest plants which might conceivably have held the nest were mulleins (*Verbascum thapsus*), the closest of these being about twenty-five to thirty feet away. A small patch of elderberry (*Sambucus canadensis*), the nearest growth in which the nest would logically have been located, was about seventy-five feet distant. In either event the nest with the contained young was carried by the hawk at least twenty-five feet, more probably seventy-five feet, to the point where the young were eaten.—J. P. Linduska, *Game Division, Dept. of Conservation, Lansing, Michigan.*

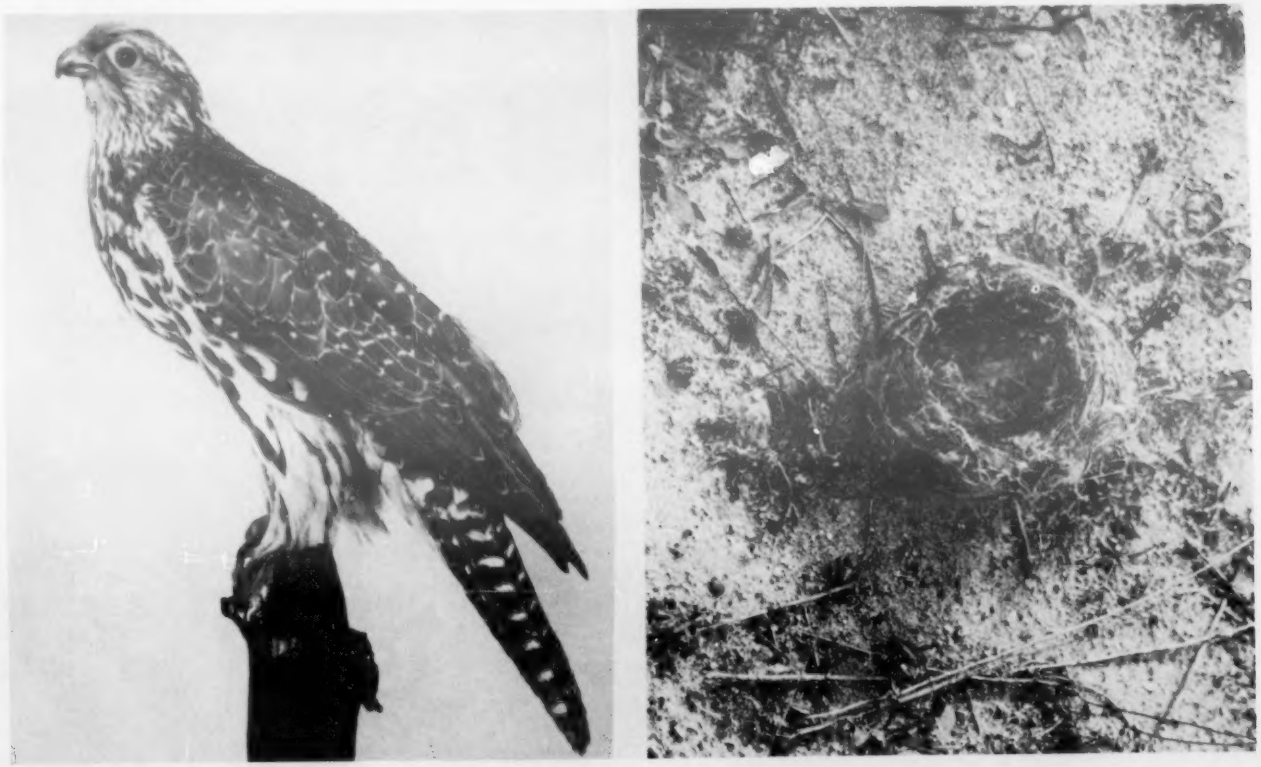
Gyrfalcon in Ohio (*Plate 14, left figure*).—Early in December, 1942, a Gyrfalcon (*Falco rusticolus*) appeared at the Stitt Game Refuge in Wood County, Ohio, where its swift flight attracted the attention of James M. Stitt. Mr. Stitt reported that its presence caused consternation among hawks of other species. The bird, which proved to be a female, was shot on December 10 and was mounted for the University Museum, Bowling Green, Ohio. Dr. H. C. Oberholser, of the Cleveland Museum of Natural History, advises me that this is the second occurrence of the Gyrfalcon in Ohio, so far as known.—E. L. Moseley, *University Museum, Bowling Green, Ohio.*

White Gyrfalcon in Quebec.—On the afternoon of April 17, 1943, about 4 P. M. while walking in The National Battlefields Park of Quebec City, I saw a White Gyrfalcon (*Falco rusticblus*). I was walking along a road near the edge of a cliff when a hawk rose from some bushes below me and flew into the air heading towards me, enabling me to observe its very white under parts. It then turned and flew across the ravine below me, first flapping and then sailing, enabling me to observe clearly its white back and wings and long, narrow, pointed wings.

On returning home, I studied my books carefully and found this bird to agree fully as to size and other details with the descriptions of the White Gyrfalcon given by Taverner, Forbush, and Peterson. I note that Forbush states that sight records of white hawks in Massachusetts may be of albino hawks. I do not think that this could be true in this instance. In the first place, this bird was a large falcon. In the second place, we had a very late and cold spring, and while there had been a little thawing in the immediate neighborhood of the city, just to the north of us it was still wintry. Migration was very late, very few birds had arrived, and no hawks had been seen. These do not arrive until the migration is well under way. As there seem to be no record of this bird from this district, I feel that this observation should be of interest.—G. S. Ahern, *8 St. Denis Ave., Quebec, Quebec.*

The Dovekie in South Carolina.—Since the famous 'invasion flight' of 1932, the Dovekie (*Alle alle*) has not been recorded from South Carolina. That phenomenon was discussed at length in 'The Auk,' 50: 325, 1933, by R. C. Murphy and William Vogt, who listed three localities in South Carolina as recorded at that time. A somewhat similar though smaller flight occurred in December, 1936, and January, 1937, but although birds were recorded freely from as far south as Florida, none made their appearance along the South Carolina coast. This flight was discussed in 'The Auk,' 55: 85, 1938, by this writer. Previous to the 1932 invasion, there had been but one record of the Dovekie for South Carolina, that of a specimen picked up dead at Beaufort, about 75 miles south of Charleston, in February, 1909. This was recorded in 'The Auk,' 30: 429, 1913.

It seems advisable, therefore, to report that the Dovekie has again appeared in lowland South Carolina during this past winter, under circumstances apparently not connected with any invasion, and constituting an isolated circumstance difficult to explain. On December 10, 1942 (exactly ten years after the great invasion), Messrs, Edward Manigault and Fred Wehman, of Charleston, were duck shooting in the North Santee River, just above the spot where the Inland Waterway crosses that body of water. They noted four small, dark birds swimming in the water ahead of the boat and, though they headed toward them and approached closely, none of the birds took flight. Coming in among them, they hit one with a boat paddle and secured it. This specimen was turned over to the writer who made



MOSELEY: GYRFALCON IN OHIO (left figure).
LINDUSKA: COOPER'S HAWK CARRYING A NEST OF YOUNG GOLDFINCHES (right figure).
Nest with a few scattered feathers.

a skin of it. The bird was a male in fine plumage but it was very thin and the stomach was empty. The four birds were seen to dive freely.

The writer kept a close watch for other records, thinking that perhaps another southward flight was in progress, but, after waiting for nearly three months, no word came from any quarter of other birds being observed or taken. No excessively cold or adverse weather had occurred previous to the arrival of the four birds listed above, and it must be taken as an isolated and inexplicable occurrence of a boreal species far south of the usual range.—ALEXANDER SPRUNT, JR., *The Crescent, Charleston, South Carolina.*

Wood Thrush in North Carolina in winter.—On January 3, 1943, a Wood Thrush was collected at Raleigh, North Carolina. Upon skinning the specimen, it was found that the left wing joint, at the humerus and radius and ulna, was enlarged, showing that at some time previously the wing had been broken. The bird was fat and in good condition; the ovary was normally developed. The Thrush had been seen several times before by Perrin Gower, Jr., who called attention to its presence.—ROXIE COLLIE SIMPSON, *North Carolina State Museum, Raleigh, North Carolina.*

Unusual breeding records from the Chicago region.—Upon examining the published accounts, I find that the following records from my notes seem to represent more or less unusual occurrences in the Chicago region. All localities are in Cook County, Illinois, except those for the Piping Plover.

Broad-winged Hawk, *Buteo p. platypterus.*—A nest with four eggs at Palos Park, Cook County, Illinois, May 10, 1930, apparently is a first breeding record for Cook County.

Piping Plover, *Charadius melodus.*—A nest with three eggs, May 30, 1937; one with two eggs, June 8, 1937; and one with four, May 30, 1941—all in Lake County, Illinois.

Wilson's Phalarope, *Steganopus tricolor.*—June 5, 1937, a nest with four eggs, at Hegewisch.

Barn Owl, *Tyto alba pratincola.*—At Palos Park, a nest with six eggs, June 3, 1936, gives another first breeding record for Cook County.

Long-eared Owl, *Asio wilsonianus.*—Nests with eggs or young, in Palos Park, April 15, 22, and 27, 1928; March 17, 1929; March 22, 1936; and March 19, 1937. Two other nests, dates not recorded, were found in the same period. The first of these dates appears to be the first actual record for Cook County. It is perhaps noteworthy that all of these nests were found in a very limited area.

Short-eared Owl, *Asio f. flammeus.*—Five nests with eggs or young were found in scattered localities of Worth, Palos Park, and Willow Springs in the spring of 1936—May 7 and 9, and June 10, 19, and 21, respectively. There are not more than two or three other nesting records in a half century or more and I have been unable to find a nest since the year named. These are first breeding records for Cook County.

Red-bellied Woodpecker, *Centurus carolinus.*—It would appear that the first record of breeding or breeding activity in Cook County is that of a pair of this species observed excavating a nest at Mt. Greenwood, May 1, 1939. Work continued until the 15th when the nest was abandoned.

Short-billed Marsh Wren, *Cistothorus stellaris.*—A late date is August 3, 1937, at Oak Lawn, where a nest with eight fresh eggs was found. When the nest was discovered on July 4, it was incomplete.

Orchard Oriole, *Icterus spurius*.—Six nests, all in pear trees, are recorded in my notes between the years 1931 and 1936. The dates range from June 5 to 30. All of these nests were found in a very restricted area between Palos Park and Orland.

LeConte's Sparrow, *Passerherbulus caudacutus*.—A nest with three eggs was found on May 30, 1932, near Evergreen Park. It was well concealed under matted dead grass. The bird left the nest when it was closely approached but was harder to flush a second time. I judge this to be the second or third record for the area.—EDWARD K. HAMMOND, *Chicago, Illinois.*

Ring-necked Duck breeding in the Province of Quebec, Canada.—On August 5, 1942, while on a trip to inspect the wild-rice crop in Rush Lake, about ten miles from the Maine border, and at the town of St. Augustin de Woburn in the Province of Quebec, Canada, two brood records of the Ring-necked Duck (*Nyroca collaris*) were obtained. The identification was made at close range with binoculars and was positive. The writer is familiar with the species on the breeding grounds of both Minnesota and Maine. Both broods, which numbered five and seven young, respectively, were over three weeks of age.

A survey by Mendall (Auk, 55: 401–404, 1938) of the existing literature concerning the distribution of breeding Ring-necked Ducks in Maine and the surrounding territory uncovered no breeding records for this species in Quebec up to that time. Mendall recently informed the writer that the 1942 observations, herein discussed, appear to constitute the first authentic nesting of the species in that province.

These two records are especially interesting because of their relation to the recent extension of the breeding range of the Ring-necked Duck through the State of Maine and the Maritime provinces of Canada.—EDWARD G. WELLEIN, *Grand Rapids, Minnesota.*

Eastern Evening Grosbeak at Berwyn, Pennsylvania.—A flock of twenty-five Eastern Evening Grosbeaks (*Hesperiphona v. vespertina*) was first observed by Mr. George W. Pyle on February 11, 1942, and some individuals were noted almost daily thereafter until May 2 when a single bird, the last for the season, was seen. This lone bird was so fearless that Mr. Pyle had little difficulty in taking a satisfactory photograph of it. My own initial observation was on March 24 in the same immediate vicinity. On April 1, a flock of fifteen appeared in a maple close to my bedroom window.

The visitation of this errant species so far beyond its normal winter range during the mild winter and spring of 1942 is remarkable also for the length of its stay in an area of less than one hundred acres. During this visitation of over two and one-half months, some parts of the whole number made their appearance in a compact flock more or less regularly in the early morning, feeding principally on the buds of the maple and gradually spreading out into a loose company until their appetites were satisfied. Then, by well-sustained though leisurely flight, they reunited, one by one, at the border of the nearest woods. The males apparently outnumbered the females three to one. This is my first personal record for the species in many years' observation.—FRANK L. BURNS, *Berwyn, Pennsylvania.*

Summer Tanager and White-eyed Vireo near Toledo, Ohio.—On June 21, 1942, in Springfield Township, Lucas County, Ohio, I found a male Summer Tanager (*Piranga rubra rubra*). My attention was attracted to the bird by its call notes with which I had become familiar in central Ohio. This is the first known record

of this species in Lucas County. On June 27, I returned to the same place to ascertain whether or not the Tanager was nesting. I was unable to find it but I did see a White-eyed Vireo (*Vireo griseus griseus*) only a short distance away. The White-eye, a singing male, remained in the same general locality until August 16. During the intervening period it was seen several times by Harold Mayfield and myself. No signs of breeding were found and only one bird was seen. It continued to sing throughout the entire period. This is the third known occurrence of the White-eyed Vireo in Lucas County during the nesting season with no evidence of breeding being discovered. Others were June 19, 1936, singing male, Swanton Township (Louis W. Campbell); and June 3, 1940, Adams Township (Wm. Anderson). My reason for grouping these two records together is to call attention to the fact that the two species, which have the same general distribution in Ohio, were found in the same limited locality near Toledo.—Louis W. Campbell, *Toledo, Ohio.*

Whistling Swan at Brookfield, Massachusetts.—From December 30, 1941, to January 10, 1942, North Dakota was in the grip of intense cold, which moved southeastward. Temperatures dropped in Minnesota on January 1, in Ohio on January 4, in North Carolina on January 6. In Massachusetts they began falling during the night of January 5–6, and early on January 8 touched the lowest point reached in six years. Relief came to Carolina on January 11; to Massachusetts on January 12.

Water birds attempting to winter in the Great Lakes region or New York State must have been caught in ice or forced to fly towards the sea, and some were too weak to reach it. On January 11, a Horned Grebe (*Colymbus auritus*) was found helpless on a street in Pittsfield, Massachusetts. Kept over night in its rescuer's bathtub, it was next day photographed and set free on a river pool. On January 12, a Common Loon (*Gavia immer*) was similarly taken from a street in Dalton, Massachusettts, to the Housatonic River. On January 24, apparently too late to be a waif from the same freeze-up but otherwise inexplicably, a female Lesser Scaup (*Nyroca affinis*), stranded on the snow in Westhampton, Massachusetts, was caught by a cat and carried home to Mrs. Nellie Harvey who for three weeks fed it bread and milk and bedded it behind her stove. It then spent another ten days in the zoölogy building at Smith College, and on February 25 was banded 'A538169', taken to Forest Park in Springfield, and turned out of its box. For a minute it failed to realize that it was free; then very suddenly it leaped from the ground into the air—requiring no run over water—and, with surprising vigor, made a high flight westward toward the Connecticut River.

On some vaguely remembered date between January 12 and 24, a Whistling Swan (*Cygnus columbianus*) was seen by Mrs. Winthrop Gay of East Brookfield, Massachusetts, who lives at the tip of a point that separates Lake Quaboag from the extensive marsh in Brookfield through which flows the lake's outlet-stream; and in this marsh it stayed, with occasional sallies into whatever lake-water was not frozen, while the sportsmen and the game warden who were told of its presence scoffed at the Gays' fancy—"Swans don't come to these parts, 'specially not in winter!" But on March 23 it was spied by Davis H. Crompton, of Worcester, a bird-student of ten years' experience, who made certain of its species (it was not a Mute Swan) and learned all he could about it from Mrs. Gay. Apprised by him many bird-students went out to the marsh and saw it. From Route 9, on the high, northwest side of the marsh, the white plumage could be seen gleaming in the afternoon sun, but at such great distance that a telescope was necessary

if one would appreciate the bird. From Mrs. Gay's point, vegetation often hid it, but sooner or later it would swim slowly into the winding stream, head held high on long, straight neck, and draw quite tamely near. On March 31, soon after sunrise, I heard it, I think, before I saw it; a whoop, of similar quality to the honks of a lone Canada Goose overhead, but higher in pitch, came out of the marsh two or three times, as if in answer to the goose, before the great, majestic bird swam forth.

April 17, when it had been there twelve or more weeks, was the last day it was seen—by Charles Everett Allen of Spencer. Though late, this is not quite the latest date for Massachusetts, for on April 18–19, 1937, following a great storm from the southwest, a lone swan was on Norwich Lake in Huntington (Bagg and Eliot, Birds of the Connecticut Valley in Massachusetts: 756).—SAMUEL A. ELIOT, JR., *Smith College, Northampton, Massachusetts.*

Scissor-tailed Flycatcher on Martha's Vineyard.—Mr. William Ross Leigh of New York City has a summer cottage at Quitsa, Martha's Vineyard, Massachusetts—a region of barren, bouldery moors, close to the island's south or ocean shore and just east of Squibnocket where the Hornblower estate has attracted much ornithological attention. He was still living there in early November, 1942. The days were calm and sunny, the nights not unduly cold. On November 4, a bird flew westward past the house, opening and closing its extremely long tail like scissors, and alighted on a bush in the open moor. Mr. Leigh promptly pursued it with an 8-power glass, and often got within fifty feet of it as it sallied after insects, dipping, sailing, and banking gracefully, returning quickly to this or that low perch, keeping to an open, unobstructed area, and showing very little alarm at his scrutiny. Besides the extraordinary tail which it wielded so well in these forays—a black tail, seven or eight inches long, or nearly half the full length of the bird—it had a light gray head, gray upper parts, whitish breast shading into pink below, and black wings with white feather-edgings and a vivid spot of red at the bend.

For five more days it stayed in this nook, fairly shielded from north and west winds, but on November 9, shortly before the weather began to turn wintry, it took its leave, first perching on a gate post and permitting inspection with the glass at twenty feet. Two Arkansas Kingbirds (*Tyrannus verticalis*) were present, too, that day, but neither species paid any heed to the other. Arkansas Kingbirds are, of course, regular (though still remarkable) visitors to Massachusetts in autumn, but the Scissor-tailed Flycatcher (*Muscivora forficata*) has hitherto been recorded in New England only in April–July: Wauregan, Connecticut, about April 27, 1876 (Bulletin of the Nuttall Ornithological Club, 2: 21, 1877); Plymouth and Duxbury, Massachusetts, May–July, 1918 (Minnie K. Batchelder in Forbush's Birds of Massachusetts and Other New England States, 2: 326); and West Springfield, Massachusetts, April 25–29, 1933 (Bagg and Eliot, Birds of the Connecticut Valley in Massachusetts: 347–349). A late-fall occurrence is, however, interestingly parallel with that of other Scissor-tails recorded in Canada in October, 1924: one found dead on October 2 at York Factory, Hudson Bay, and one taken on Grand Menan, New Brunswick, on October 26 (reported in 1924 in the mimeographed 'Items of Interest' sent out by E. H. Forbush from the State House, Boston, Massachusetts; misdated "1925" in 'The Auk,' 44: 224, 1927). How interesting it might be to have a meteorologist analyze the winds recorded in the month or so preceding these various dates at weather stations between New England and Panama, and

MEANLEY: UPLAND PLOVER IN MARYLAND.

(Upper) Upland Plover incubating; Baltimore, May, 1936.
(Lower) Young Upland Plover, approximately three days old; June, 1936.

make a guess whether these flycatchers were voluntary vagrants or were blown northward willy-nilly!—SAMUEL A. ELIOT, JR., *Smith College, Northampton, Mass.*

Nesting of the Upland Plover in Baltimore County, Maryland (*Plate 15*).—In Maryland, breeding Upland Plovers are largely confined to the larger and more fertile valleys of the northern and western parts of the state. It is in one of these northern Maryland valleys, fifteen miles north of Baltimore, that for seven successive seasons Upland Plovers have nested. In this valley, one ungrazed hay meadow, comprising approximately eight acres of pure Kentucky blue grass was used exclusively for nesting each spring, and also served as a feeding ground after harvesting. Hilly pastures adjacent to the hay meadow represented the chief feeding habitat and was the type most frequented. Grain stubble was used to a considerable extent as an alternate feeding and loafing type. It seems reasonable to assume that grazing is an important limiting factor in the selection of a field for nesting, since only one nest was located in hilly-pasture type, and that was found at a late date after the ungrazed hay meadow had been harvested.

The plovers seem to choose their nesting site indiscriminately in the ungrazed meadow, placing their eggs in mere depressions down in the grass and apparently disregarding available clumps, knolls, or tufts offering a more substantial nesting site. Territorial relationships seem to be outmoded by the plovers in this valley since they nest together in the same meadows, feed together, loaf together, and show no signs of belligerence. On one occasion two nests were found eight feet apart and none of the nests found were more than fifty yards apart. When a nest was approached, neighboring birds would often join the inhabitants in a vociferous protest.

Nesting dates from ungrazed blue-grass meadow (all clutches fresh): May 15, 1936—Two nests found; one of three and one of four eggs. Nests eight feet apart. Nest of three eggs had four eggs on May 16. May 16, 1937—Nest of four eggs. May 21, 1938—Nest of four eggs. May 15, 1939—Nest of four eggs. May 17, 1940—Nest of four eggs. June 10, 1940—Nest of four eggs in pasture frequented by some thirty or forty horses; a quarter-mile from blue-grass meadow. June 8, 1941—Young approximately three days old, in blue-grass meadow. May 10, 1942—Two nests, one of three and one of four eggs; thirty yards apart. Nest of three eggs had four eggs on May 11.

The mortality rate of the Baltimore County Upland Plovers is quite low and it would seem that the plover population here should increase, yet it has remained nearly stable year after year. In 1935 there were five pairs present and each year thereafter through 1942, three pairs have returned to the valley to nest.—BROOKE MEANLEY, *Patuxent Refuge, Bowie, Maryland.*

Mountain Bluebird in Minnesota.—At the suggestion of Dr. T. S. Roberts of the Museum of Natural History of the University of Minnesota, I am writing to report a Mountain Bluebird (*Sialia currucoides*) which came to Duluth this past winter. I saw it first on February 4 and ten or twelve times after that and it was also observed by several other members of our bird clubs. Mrs. Robert Rowe told me she thought five or six of them had been feeding in her yard since between Thanksgiving and Christmas. I asked her to check closely as to the number and color to see if they were all males and she reported seeing three at a time, one of which was grayer than the others, indicating that it was a female. They came to eat the dry bread crumbs and cracked grain which she fed them. I saw a ma'

eating mountain-ash berries and also saw it on the ground where it apparently found seeds. On March 14, 15, and 16 we had strong winds and snow. Two of the birds were seen on March 13 and one on March 14. Since then there is no record of their being seen, so they may not have survived the storm. Dr. Roberts has one other record of the Mountain Bluebird in Minnesota; a pair was found near St. Cloud on April 5, 1935.—Mrs. Walter C. Olin, *Duluth, Minnesota.*

Additional bird records from Alaska.—Frank L. Beals, stationed in the Aleutian Islands during the winters of 1940–1941 and 1941–1942, collected a number of birds. Among them are several gulls which seem worthy of record.

"Point Barrow Glaucous Gull, *Larus hyperboreus barrovianus.*"—A female was taken at Unalaska, March 5, 1942.

Slaty-backed Gull, *Larus schistisagus.*—A female was taken at Atka on February 14, 1942, and the wings, feet and head of a male were preserved, taken at Sanak Harbor, March 15, 1942.

Vega Gull, *Larus argentatus vegae.*—A female was collected at Unalaska on February 14, 1942.—Ira N. Gabrielson.

A second specimen of the fossil Guillemot, *Miocepphus.*—The type specimen of *Miocepphus mcclungi* Wetmore, a right humerus, described in the Journal of Morphology, 66: 35, January, 1940, was collected in 1939 in Zone 12 of the Calvert Miocene in the earthen cliffs of the western shore of Chesapeake Bay, Maryland, nine-tenths of a mile north of the mouth of Parker Creek. On July 5, 1941, Dr. W. F. Foshag, who found the type, obtained a second specimen, a left humerus, in the cliff bank 425 yards south of the mouth of Parker Creek. The bone was found in place, also in Zone 12. This second specimen is fairly complete except for a certain amount of weathering at the extremities and some wear at various points along the shaft. It is a somewhat more slender bone than the type, with the processes of the head and of the distal end slightly less developed. These differences are slight and appear to be wholly individual, since they parallel exactly the individual differences evident in a series of humeri of the living Black Guillemot, *Cepphus grylle.* Measurements of the new find, which is No. 16741 in the vertebrate paleontological collections of the U. S. National Museum, are as follows: total length, 60.1 mm.; greatest transverse breadth of shaft near center, 4.8; least thickness of shaft near center, 3.0; transverse width across distal condyles, (approximate) 8.9.

The bird in size is about like the Black Guillemot, and shows affinity with modern species of *Cepphus* and *Brachyramphus.*—Alexander Wetmore, *U. S. National Museum, Washington, D. C.*

***Rhinortha chlorophaea* in Borneo.**—In 'The Auk,' 59: 576, 1942, I noted that the name *Rhinortha chlorophaea fuscigularis* Baker (type locality Sarawak) seemed untenable. Dr. Ernst Mayr pointed out to me (in litt.) that he had discussed this matter in his paper on birds from south Borneo (Bull. Raffles Museum, no. 14: 28, 1938) in which he carefully describes the characters of *fuscigularis.* This race is distinguished primarily by the females having a rufous throat similar to the male plumage. On re-examining the specimens in the collection of the U. S. National Museum, I find that there is a single female from Sarawak. In coloration and size it agrees perfectly with the characters as given for *fuscigularis.* Later in the same paper, Mayr points out that the gray-throated birds from south and east Borneo will probably require a name. I have examined twenty-six specimens

from north Borneo (Lumbidan in Lawas River area of Brunei), and southeast Borneo (Raven coll.), and I feel that the differences between these birds and *c. chlorophaea* are too small to be distinguishable. These birds measure: wing, ♂, 108–116 mm. (av., 112.9); ♀, 108–114 (110.3); tail, ♂, 151–168 (161.4); ♀, 147–167 (158.5). Twenty specimens from Sumatra and the Malay Peninsula measure: wing, ♂, 110.5–119 (115.3); ♀, 110–119 (115.96); tail, ♂, 159.5–178.5 (167.8); ♀, 162.5–177.5 (169.8). There is far too much overlap in these measurements for the differences to be significant and the amount of buffy suffusion on the gray throat and crown is too variable for recognition.

It would thus seem well to list the populations of this cuckoo in Borneo as follows:

Rhinortha chlorophaea fuscigularis Stuart Baker

Range.—Sarawak and northwest Netherlands Borneo.

Rhinortha chlorophaea chlorophaea Raffles

Range.—Eastern Brunei, British North, and southern Borneo.

—S. Dillon Ripley, *U. S. National Museum, Washington, D. C.*

Bachman's Sparrow in Maryland (*Plate 16*).—The Bachman's Sparrow (*Aimophila aestivalis bachmani*) is known to be quite rare and irregular in distribution in the northern part of its range. Because of this the northern limits of its range have been rather ill-defined. According to the A. O. U. Check-List, Fourth Edition: 343, 1931, this bird ranges north to central Virginia in the eastern part of its range and is casual near Washington, D. C. Its distribution in the north-central portion of its range, including the Appalachian Mountains, is discussed in detail by Brooks (Wilson Bull., 50: 86–109, 1938). The discovery in May, 1942, of three pairs of these birds nesting on the Beltsville Research Center, Prince George County, Maryland, considerably extends the northern limits of the known breeding range of this species in the Piedmont and coastal-plain region east of the Appalachian Mountains.

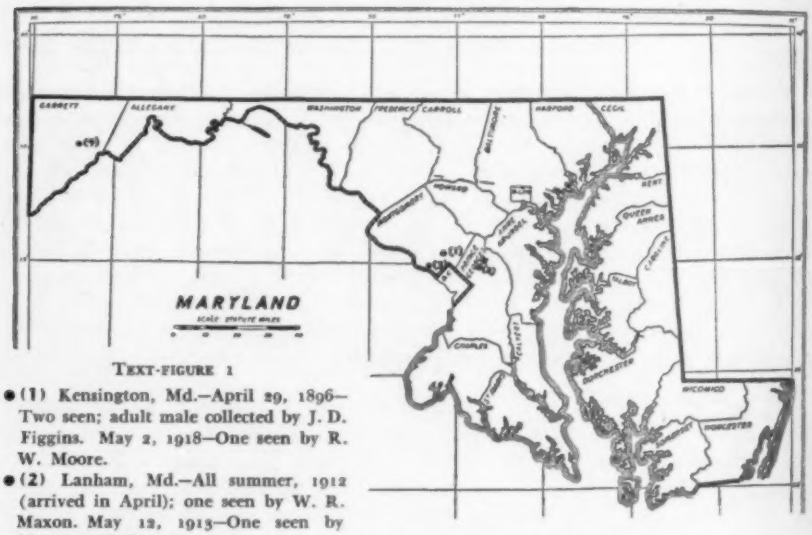
On May 10, 1942, Mr. A. C. Martin, of the Fish and Wildlife Service, heard a bird song at the Beltsville Research Center, which reminded him of the song of the Bachman's Sparrow that he had heard seventeen years before in North Carolina. During the following day, the area in which the song was heard was visited by the authors and it was not long before the songster was sighted and positively identified as a Bachman's Sparrow, a species which has been recorded but very few times from Maryland.

After thorough coverage of the region surrounding the spot where the bird was first seen and heard, it was found that three pairs of Bachman's Sparrow were present, all being found in one area approximately seven acres in extent. Although the region in which these birds were found is physiographically a part of the Coastal Plain, near its inner boundary, it cannot be considered as typical since the surrounding low, rolling hills bear a close resemblance to the Piedmont region. The vegetation of the area is composed of a dense ground cover made up principally of blueberry (*Vaccinium vacillans*), lupine (*Lupinus perennis*), poison oak (*Toxicodendron quercifolia*), and hoary pea (*Tephrosia virginiana*), with scattered saplings of hickory (*Carya* sp.) and scattered trees of scrub pine (*Pinus virginiana*). Associated species of birds found nesting within the area are listed as follows in the approximate order of their relative abundance: Field Sparrow (*Spizella pusilla*), Chipping Sparrow (*Spizella passerina*), Prairie Warbler (*Dendroica discolor*), Vesper Sparrow (*Pooecetes gramineus*), and Kingbird (*Tyrannus tyrannus*).

Considerable time was spent in searching for nests of the Bachman's Sparrow,

which are generally considered to be very difficult to locate. Finally, on May 26, 1942, one was found. This nest was plainly domed or roofed over and contained five immaculate, white eggs. This appears to represent the first definite breeding record of the Bachman's Sparrow in Maryland. The two accompanying photographs were taken of this nest, one showing nest and eggs, and one taken later showing an adult in front of the nest before entering to feed the young. The young had all hatched by June 3, but were destroyed a few days later by some predator. This nest was situated only ten feet from a Field Sparrow's nest with young that successfully left the nest at about the time that the Bachman's Sparrow's eggs had hatched.

The time and location of records of the Bachman's Sparrow in Maryland are indicated on the following map (Text-fig. 1). The Garrett County record is in



TEXT-FIGURE 1

● (1) Kensington, Md.—April 29, 1896—Two seen; adult male collected by J. D. Figgins. May 2, 1918—One seen by R. W. Moore.
● (2) Lanham, Md.—All summer, 1912 (arrived in April); one seen by W. R. Maxon. May 12, 1913—One seen by Maxon and Kearney.
● (3) Cabin John, Md.—May 9, 1915—One seen by A. Wetmore.
● (4) Oakland, Md.—June, 1923—One seen by Maurice Brooks.
★ New breeding record, Beltsville Research Center, spring and summer, 1942.

the Appalachian region that was covered by Maurice Brooks (1938) in his study of the distribution of the Bachman's Sparrow in the north-central part of its range.

Grateful acknowledgement is made to the Natural History Society of Maryland and especially to C. Haven Kolb, Jr., and Irving E. Hampe, for their efforts in going over their records for information pertaining to the Bachman's Sparrow in Maryland.—ROBERT E. STEWART AND BROOKE MEANLEY.

Nevada Savannah Sparrow and Northern Pine Siskin in Louisiana and Mississippi.—What is assumed to be the first record for Louisiana of the Nevada Savannah Sparrow (*Passerculus sandwichensis nevadensis*) is supplied by a bird collected on November 26, 1942, ten miles east of Shreveport, Louisiana. A flock of Savannah Sparrows was being observed under binoculars when one among them was noted as being much lighter in coloration than the others. This bird was collected and

STEWART AND MEANLEY: BACHMAN'S SPARROW IN MARYLAND.
(Left) Nest and eggs. (Right) Nest and adult arriving with food for the young.

the specimen was forwarded to Dr. Pierce Brodkorb, Museum of Zoology, University of Michigan, who identified it as *nevadensis*.

Another specimen of the species, taken six miles south of Vicksburg, Mississippi, on November 9, 1941, was sent to Dr. James L. Peters, Museum of Comparative Zoölogy, Cambridge, Massachusetts, and was returned marked '*nevadensis*.' This is considered to constitute the first record for the State of Mississippi of this bird.

Oberholser, in his 'Birds of Louisiana' (Bull. 28, Dept. of Conserv., State of Louisiana, 1938), reports that no specimen of the Northern Pine Siskin (*Spinus pinus pinus*) has been taken in that state since 1879, when a single specimen was collected at Mandeville in the southeastern part of the state. Several sight records have been reported but apparently no example has been collected. On March 28, 1942, near Columbia, Caldwell Parish, Louisiana, in the northeastern section of the state, two Northern Pine Siskins were noted in a flock of Eastern Goldfinches. The two birds were collected, one proving to be an adult male; the other, an adult female. While an occasional sight record of this siskin has been reported from the state of Mississippi, so far as I am able to ascertain no specimen has ever been taken within the borders of the state. On January 23, 1942, while I was collecting eight miles north of Vicksburg, a single bird flew to the top of a nearby tree and, after momentary observation, was taken. It proved to be an adult male. The three specimens above mentioned are now in my private collection at Vicksburg, Mississippi.—M. L. Miles, *Vicksburg, Mississippi.*

Hooded Warbler in North Dakota.—The 1942 warbler migration at Kenmare, Ward County, North Dakota, was rich in species (seventeen) for a locality so far west on the Great Plains. On June 1, near the end of the northward flight, I found a male Hooded Warbler singing in shrubby undergrowth on a wooded coulee slope on the Des Lacs National Wildlife Refuge, about two miles south of Kenmare. The bird was observed at close range for several minutes, both without and with 7-power binoculars. It behaved as in the vicinity of Washington, D. C., where I have been familiar with the species for several years, the song being vigorous and loud and the movements leisurely.

In spite of its geographical position, the Kenmare area has, in the valley of the Riviere des Lacs and its several prominent coulees, a considerable amount of woodland. This is composed principally of eastern species of plants and is inhabited in summer mainly by eastern birds (some exceptions are Swainson's Hawk, Magpie, Willow Thrush, Long-tailed Chat, and Arctic Towhee), while the surrounding, nearly level upland has a predominantly Great Plains flora and fauna.

This appears to be the first record of a Hooded Warbler for the state. It is interesting to note (Audubon Magazine, 44, Section II, for July–August, 1942) that Hooded Warblers were found north of their usual range in the spring of 1942 in Minnesota and Massachusetts.—Neil Hotchkiss, *U. S. Fish and Wildlife Service, Bowie, Maryland.*

A third record of the American Redstart for New Mexico.—Two occurrences of the American Redstart (*Setophaga ruticilla*) in New Mexico have been recorded by Florence Merriam Bailey ('Birds of New Mexico': 633, 1928). A single bird was taken at Kingston, August 24, 1904, and a pair was seen at Shiprock, May 27, 1907. However, the species has apparently not been reported recently from New Mexico. On the morning of September 1, 1941, we saw a single individual at the headquarters of the Jornada Experimental Range near Las Cruces, Dona Ana County,

New Mexico. The bird was evidently a female or immature bird as the distinctive markings on the tail, sides, and wings were yellow. We were able to watch the bird at close range for some time as it flitted in and out of the shrubbery.—ARTHUR F. HALLORAN, *Fish and Wildlife Service, Las Cruces, New Mexico,* and ALBERT H. TROWBRIDGE, *Fish and Wildlife Service, Tucson, Arizona.*

A new grosbeak from northwestern Thailand.[1]—The spotted-winged grosbeak resident in small numbers on certain of the higher peaks of northwestern Thailand is sufficiently distinct from birds believed to represent the nominate race (Nepal) to justify erection of a new subspecies. I propose to name it:

Mycerobas melanozanthos fratris-regis, subsp. nov.

TYPE.—Adult male, U. S. National Museum no. 336124, collected on Doi Suthep, Chiang Mai province, N. W. Thailand, at 5,500 feet, February 2, 1936, by H. G. Deignan.

Since no fresh topotypical material of *melanozanthos* has been available, I have found it necessary to compare Thai specimens with examples from Szechuan and N. W. Yunnan, considered by recent authors to be inseparable from more western Himalayan birds. From these Chinese birds, *fratris-regis* differs in having the upper parts deep slate, not black, and the under parts a decidedly paler lemon-chrome (Ridgway). The wing-length of six Chinese adult males ranges from 122.2 to 129.3 mm.; that of three adult males of *fratris-regis,* from 117.3 to 120.9 mm.

The distinctions here pointed out have already been noted both by De Schauensee (Proc. Acad. Nat. Sci. Philadelphia, 86: 236, 1934) and by Riley (U. S. Nat. Mus. Bull., 172: 533–534, 1938), each of whom, possessing but a single male from Thailand, refrained from naming the more southern race.

The new form is dedicated to H.R.H. Phra Pin Klao, younger brother of H.S.M. Phra Chom Klao (Maha Mongkut or Rama IV) and Second King of Siam during the latter's reign, who first among the Thai cultivated a scientific interest in the natural productions of his country. Ruschenberger ('A Voyage round the World,' Philadelphia, 1838) in 1836 viewed his zoölogical gardens and his "private museum, in which there [were] many fine specimens of natural history; quadrupeds, birds, reptiles, &c., all preserved and set up by himself" (p. 294). As a Corresponding Member of The National Institution for the Promotion of Science, as early as 1843 he forwarded to Washington specimens of birds, mammals, reptiles, fishes, and "vegetable formations," in exchange for which he requested works "on military or naval art, such as field exercises, heavy ordnance, and the science of war." Of the ornithological material, more than sixty specimens may still be seen in the museums of Philadelphia and Washington. It is fitting that the memory of this early Asiatic naturalist, who, by one writer, was described as "a perfect wonder of education and intellectual attainments," be associated with the largest and handsomest fringillid yet known from his native land.—H. G. DEIGNAN, *Washington, D. C.*

A correction.—Owing to war conditions, the authors of the paper on 'Incubation and Fledging Periods of African Birds' (Auk, 57: 313–325, 1940) were not able to read their proofs; and on p. 316 the paragraph beginning "December 2" should be deleted.—R. E. MOREAU, *Amani, Tanganyika Territory.*

[1] Published with permission of the Secretary of the Smithsonian Institution.

RECENT LITERATURE

Ecological geography.[1]—There have been many efforts to classify the ecologic divisions of the North American continent in a way that would satisfy all the various biological fields, although it is doubtful if such a result is attainable. All forms of life do not conform to identical standards although all are interwoven in varying degrees of relationship. Whatever boundaries are put on the divisions, therefore, will always fail to delimit the ranges of many of the plants or animals that live in them and even the divisions, themselves, can not always be precisely bounded. The best that can be done is to examine as much of the evidence as possible and balance the factors equably.

This Dr. Dice has done in the present volume which he presents, not as a final classification but as an outline to bring the study up to date and stimulate future work. His arrangement is a fairly complex one, far different from the early designs of Merriam and others which have been so greatly criticized in recent years but which had the virtue of simplicity. With Dr. Dice's twenty-nine 'provinces' of equal rank, something of this simplicity has been lost. Perhaps it had to go with the increased knowledge of the times and perhaps some of it could be retained by grouping various of the 'provinces' together into larger divisions for generalized usage.

Be that as it may, even the biotic 'provinces' are divisible into 'biotic districts' and these into vertical 'life belts' made up of their own 'ecologic associations.' Some of these are discussed briefly in the present text. The 'provinces,' always continuous (except on marine islands) and thereby different from 'biomes,' are described in some detail—their geography, topography, geology, climate, flora, and fauna, at least in their salient features. Admittedly the flora has provided the principal basis for the deductions. Some of the 'provinces' will be found very similar to earlier divisions proposed under other names; some with familiar names, it will be noted, have considerably altered boundaries; most of them have been suggested at one time or another by previous writers, but some present new concepts. Previous authorities are cited in each case. Whatever the status in this respect, Dr. Dice has outlined the evidence on which he bases his acceptance of the 'province' as entitled to recognition. He has thus developed an interesting and careful classification and it now remains to be seen how well forthcoming knowledge of the distribution of different forms of life will be found to fit into the pattern here presented.—J. T. Zimmer.

A study of the English Robin.[2]—During a period of four years, Mr. Lack carried out a series of observations and experiments on the behavior of the British Robin in a limited area in South Devon. Several formal reports have appeared in different scientific journals giving certain results of these studies and in the little volume at hand the entire investigation is summarized.

At the beginning of the study, all the Robins in the vicinity were marked with colored leg-bands for individual identification of the birds concerned. Many interesting facts were discovered and a generalized behavior pattern has been outlined, although Mr. Lack has been careful not to generalize until the same activity was observed at least six times. Individual idiosyncracies thus appear in their

[1] Dice, Lee R. 'The Biotic Provinces of North America.' Royal 8vo, viii + 78, 1 map (fold.), 1943. University of Michigan Press, Ann Arbor. Price, $1.75.

[2] Lack, David. 'The Life of the Robin.' 16mo, 1–200, 6 pls., 2 figs., 1943. H. F. & G. Witherby, Ltd., London. Price, 7s. 6d.

proper light. Territory was given its share of attention. Lack disputes the 'optimum spacing' theory and concludes that it is not the food value of the territory that determines its extent but rather that the size of the breeding population as a whole in a given area has considerable effect in determining the space claimed by each breeding male. The areas are not constant for individual birds from year to year.

Stuffed Robins were used to study the birds' reactions to intruders. It was found that a tuft of red breast feathers alone would induce attack whereas a complete specimen with the red breast camouflaged by brown color might be ignored. One of the most interesting observations concerns a female that had been attacking a mounted specimen for forty minutes and that, when the mount was removed, continued to attack the empty air at the place where the mount had been stationed.

Fighting is believed to be a compound behavior incompletely divisible into three parts—flying-in-pursuit, threat display, and actual striking, each with its own signal or releaser. These are, respectively, the sight of a small bird flying away, the sight of red breast feathers, and an object with the shape of a Robin. A stuffed specimen thus did not always induce all three parts of the reaction since it presented only part of the releasers.

Interesting calculations were made on the longevity and life-expectancy of the species based on individuals found dead. With ten or eleven years the usual maximum life-span, the life-expectancy at any age after the young bird has reached the date of August 1, is just over thirteen months. Seventy-seven per cent of the young die during their first year but only seventy-two per cent of those that live until August 1 die before the next August; sixty-two per cent of the adults die from one August to the next.

These are but samples of the details that Mr. Lack gives in his interesting account. There are discussions of song, pairing, fighting, care of nests and young, migration (indulged in only by females and not all of these), food and feeding, recognition, and tameness, and a digression on 'instinct.' Throughout, there are comparisons with the behavior of other species so that the treatment is rather more complete with respect to birds in general than the title indicates. The book, thus, gives not only a fine account of the life of a common species, less well known than might have been believed, but something also about birds in general.—J. T. Zimmer.

Nature on a Welsh island.[1]—In 1927, the author purchased an abandoned island, some 250 acres in extent, lying off the coast of Pembrokeshire, to which he moved and where he lived until 1940. This little book describes his life on the island, his work to make the place self-supporting, and nature as he found it there. Being keenly interested in natural history, he was able to make good use of his time to study the animals and plants of the island at close range. Thirty-four species of birds were found breeding, at one time or another, on the island and 114 others were regular or casual visitors. Puffins and shearwaters nested in old rabbit burrows, gulls and razorbills on the cliffs, and other species in suitable places and in varying abundance. Of many of these, Mr. Lockley has something to say concerning their arrival, behavior, song, and other characteristics. The other animal life of the island and the waters surrounding it, the flowers, the seasons, and human visitors, as well as his visits to other islets (such as Grassholm

[1] Lockley, R. M. 'Dream Island Days. A Record of the Simple Life.' Pp. 1–144, 8 pls., 26 figs., map (end pap.), 1943. H. F. & G. Witherby, London. Price, 10s, 6d.

with its Gannet colony) are entertainingly discussed and there are appended lists of the birds and plants of his own homestead.

The book is made up in part of two earlier works, 'Dream Island' and 'Island Days,' with some revisions and additions. Illustrations are from sketches by Mrs. Lockley and photographs. Readers who missed the earlier volumes will find the present account pleasantly interesting.—J. T. ZIMMER.

Lapland Longspur nesting.[1]—The Lapland Longspur is the most abundant breeding passerine bird on the eastern Timan tundra of northern Russia, where it was studied, principally near the lower Velt River in 68° north latitude. Its nesting cycle was followed from the arrival of the first little group of ten or fifteen males when there were spacious thawed areas in the generally snow- and ice-bound landscape on May 8, until young of the year and adults had assumed first winter plumage prior to southward migration.

The mass arrival of males began May 12, and up to the 17th, thousands of feeding birds were present on the bottom land of the river mouth. Later they decreased in number, presumably due to transients passing on. They fed about piles of thawing rubble, which had been drifted at the edge of the water by autumn winds. The first females were seen on May 13, and their mass arrival was on the 21st. They scattered out more singly than the males from which they kept separate for the most part. From May 25 to 29, the weather became markedly warmer, the snow cover disappeared almost completely, and the birds broke up into pairs and dispersed over the tundra. Their dispersal was accomplished by violent fighting between the males, which eventually resulted in very definite territories being established by each pair, with an average diameter of about 100 meters (presumably greater in areas where the species nests less plentifully). This territory was strictly maintained until the young left the nest; food also was gathered within its limits. Other intruding birds than Longspurs were driven from it, especially the Red-throated Pipit with similar nesting habits, and which established similar territories, averaging on brushier ground. With young in the nest it was found that the human observer was not tolerated anywhere within a bird's territory, but no attention paid to him outside its periphery. In the bottomlands the food of the Longspurs consisted mainly of seeds, with a few insects, mostly pupae; when they dispersed on the tundra it changed abruptly, almost entirely to insects.

May 30 marked the beginning of nest construction, and mass building took place in the early part of June. The bowls of the nests were inclined to the east, south, or southeast, doubtless correlated with the rarity of southeast winds at this season. All nests had a lining of small, white ptarmigan feathers. June 4 marked the beginning of egg laying, which became general June 6 to 8. Brooding occupied only ten days (a longer period has been reported elsewhere). Only the female sat on the eggs, but the male remained on guard nearby. Brooding ceased when the majority of the young had hatched; one or two others might have hatched later from the warmth of their nestmates, and there was usually at least one egg in each nest which did not hatch. The parents shared feeding of the young. The first young bird was noted out of the egg June 20; the young remained in the nest eight to ten days; the first were out of the nest in the last days of June, and there was a mass appearance of such young in the beginning of July. Young

[1] Mikheev, A. V. 'Contributions to the Biology of the Lapland Longspur (*Calcarius lapponicus* L.)' [in Russian]. Publ. Acad. Sci. U. S. S. R., Zool. Jour. Moscow, 18 (5): 924–938, 1939.

proper light. Territory was given its share of attention. Lack disputes the 'optimum spacing' theory and concludes that it is not the food value of the territory that determines its extent but rather that the size of the breeding population as a whole in a given area has considerable effect in determining the space claimed by each breeding male. The areas are not constant for individual birds from year to year.

Stuffed Robins were used to study the birds' reactions to intruders. It was found that a tuft of red breast feathers alone would induce attack whereas a complete specimen with the red breast camouflaged by brown color might be ignored. One of the most interesting observations concerns a female that had been attacking a mounted specimen for forty minutes and that, when the mount was removed, continued to attack the empty air at the place where the mount had been stationed.

Fighting is believed to be a compound behavior incompletely divisible into three parts—flying-in-pursuit, threat display, and actual striking, each with its own signal or releaser. These are, respectively, the sight of a small bird flying away, the sight of red breast feathers, and an object with the shape of a Robin. A stuffed specimen thus did not always induce all three parts of the reaction since it presented only part of the releasers.

Interesting calculations were made on the longevity and life-expectancy of the species based on individuals found dead. With ten or eleven years the usual maximum life-span, the life-expectancy at any age after the young bird has reached the date of August 1, is just over thirteen months. Seventy-seven per cent of the young die during their first year but only seventy-two per cent of those that live until August 1 die before the next August; sixty-two per cent of the adults die from one August to the next.

These are but samples of the details that Mr. Lack gives in his interesting account. There are discussions of song, pairing, fighting, care of nests and young, migration (indulged in only by females and not all of these), food and feeding, recognition, and tameness, and a digression on 'instinct.' Throughout, there are comparisons with the behavior of other species so that the treatment is rather more complete with respect to birds in general than the title indicates. The book, thus, gives not only a fine account of the life of a common species, less well known than might have been believed, but something also about birds in general.—J. T. Zimmer.

Nature on a Welsh island.[1]—In 1927, the author purchased an abandoned island, some 250 acres in extent, lying off the coast of Pembrokeshire, to which he moved and where he lived until 1940. This little book describes his life on the island, his work to make the place self-supporting, and nature as he found it there. Being keenly interested in natural history, he was able to make good use of his time to study the animals and plants of the island at close range. Thirty-four species of birds were found breeding, at one time or another, on the island and 114 others were regular or casual visitors. Puffins and shearwaters nested in old rabbit burrows, gulls and razorbills on the cliffs, and other species in suitable places and in varying abundance. Of many of these, Mr. Lockley has something to say concerning their arrival, behavior, song, and other characteristics. The other animal life of the island and the waters surrounding it, the flowers, the seasons, and human visitors, as well as his visits to other islets (such as Grassholm

[1] Lockley, R. M. 'Dream Island Days. A Record of the Simple Life.' Pp. 1–144, 8 pls., 26 figs., map (end pap.), 1943. H. F. & G. Witherby, London. Price, 10s, 6d.

with its Gannet colony) are entertainingly discussed and there are appended lists of the birds and plants of his own homestead.

The book is made up in part of two earlier works, 'Dream Island' and 'Island Days,' with some revisions and additions. Illustrations are from sketches by Mrs. Lockley and photographs. Readers who missed the earlier volumes will find the present account pleasantly interesting.—J. T. ZIMMER.

Lapland Longspur nesting.[1]—The Lapland Longspur is the most abundant breeding passerine bird on the eastern Timan tundra of northern Russia, where it was studied, principally near the lower Velt River in 68° north latitude. Its nesting cycle was followed from the arrival of the first little group of ten or fifteen males when there were spacious thawed areas in the generally snow- and ice-bound landscape on May 8, until young of the year and adults had assumed first winter plumage prior to southward migration.

The mass arrival of males began May 12, and up to the 17th, thousands of feeding birds were present on the bottom land of the river mouth. Later they decreased in number, presumably due to transients passing on. They fed about piles of thawing rubble, which had been drifted at the edge of the water by autumn winds. The first females were seen on May 13, and their mass arrival was on the 21st. They scattered out more singly than the males from which they kept separate for the most part. From May 25 to 29, the weather became markedly warmer, the snow cover disappeared almost completely, and the birds broke up into pairs and dispersed over the tundra. Their dispersal was accomplished by violent fighting between the males, which eventually resulted in very definite territories being established by each pair, with an average diameter of about 100 meters (presumably greater in areas where the species nests less plentifully). This territory was strictly maintained until the young left the nest; food also was gathered within its limits. Other intruding birds than Longspurs were driven from it, especially the Red-throated Pipit with similar nesting habits, and which established similar territories, averaging on brushier ground. With young in the nest it was found that the human observer was not tolerated anywhere within a bird's territory, but no attention paid to him outside its periphery. In the bottomlands the food of the Longspurs consisted mainly of seeds, with a few insects, mostly pupae; when they dispersed on the tundra it changed abruptly, almost entirely to insects.

May 30 marked the beginning of nest construction, and mass building took place in the early part of June. The bowls of the nests were inclined to the east, south, or southeast, doubtless correlated with the rarity of southeast winds at this season. All nests had a lining of small, white ptarmigan feathers. June 4 marked the beginning of egg laying, which became general June 6 to 8. Brooding occupied only ten days (a longer period has been reported elsewhere). Only the female sat on the eggs, but the male remained on guard nearby. Brooding ceased when the majority of the young had hatched; one or two others might have hatched later from the warmth of their nestmates, and there was usually at least one egg in each nest which did not hatch. The parents shared feeding of the young. The first young bird was noted out of the egg June 20; the young remained in the nest eight to ten days; the first were out of the nest in the last days of June, and there was a mass appearance of such young in the beginning of July. Young

[1] Mikheev, A. V. 'Contributions to the Biology of the Lapland Longspur (*Calcarius lapponicus* L.)' [in Russian]. Publ. Acad. Sci. U. S. S. R., Zool. Jour. Moscow, 18 (5): 924–938, 1939.

matured and left all the nests under observation; but at this stage, when only able to fly weakly, they were much preyed upon by jaegers and other predacious birds, and were soon removed off the tundra to thickets of willow along river banks or in low places, where they had more protection.

The speed and uniformity of the Longspur's nesting cycle, here observed, is interesting as probably correlated with a short season in a high northern latitude. Its very definite, seemingly uncomplicated territorialism appears to be highly efficient.—J. T. NICHOLS.

The Wild Turkey.[1]—Beginning with a general review of the history of the Wild Turkey and its status in America, Virginia in particular, and the methods of hunting it, the authors pass to a detailed study of the bird and its life history—its general characteristics at different ages, breeding activities, feeding and other behavior, flight, and longevity. The remainder of the volume discusses the propagation and management of the bird in captivity and its encouragement in the wild, with recommendations for legislation and public policy. Full use has been made of available published information to which are added the results of the authors' investigations and observations, making a comprehensive report on this, the finest of American upland game birds. Although pointed especially at conditions in Virginia, much information is presented from other regions and the book should prove useful and informative in all parts of the range of the species. It is copiously illustrated with photographs, maps and drawings, and two colored plates by Fred Everett.—J. T. ZIMMER.

PERIODICAL LITERATURE

ABBOTT, ROY L. My upside-down bird. Frontiers, 7 (4): 114–116, Apr., 1943.

ADOLPH, P. A. Convulsions in male House Sparrows. Brit. Birds, **36** (7): 140–141, Dec. 1, 1942.

ADOLPH, P. A. Hedge-Sparrow adapting Blackcap's nest. Brit. Birds, **36** (5): 94–95, Oct. 1, 1942.

ALDEN, ROLAND H., AND IFFT, JOHN D. Early naturalists in the far west. Occ. Pap. Calif. Acad. Sci., no. **20**: 4 pp. (unnum.), 1–59, 1 pl., Apr. 30, 1943.—Brief biographical sketches, some of ornithological interest.

ALDOUS, SHALER E. Sharp-tailed Grouse in the sand dune country of north-central North Dakota. Jour. Wildl. Managem., **7** (1): 23–31, pls. 1–2, fig. 1, Jan., 1943.

ALER, LULU MAY. Bluebird—Sialia aquatica. Frontiers, **7** (4): 109–110, Apr., 1943.

ALEXANDER, H. G. Report on the bird-song inquiry organized by the British Trust for Ornithology (concl.). Brit. Birds, **36** (6): 102–109, Nov. 2, 1942.

ALEXANDER, H. G. Report on the bird-song inquiry organized by the British Trust for Ornithology (cont.). Brit. Birds, **36** (5): 86–92, Oct. 1, 1942.

ALEXANDER, W. B. Hobbies catching mayflies. Brit. Birds, **36** (7): 141–142, Dec. 1, 1942.

ALEXANDER, W. B. The index of heron population, 1942. Brit. Birds, **36** (11): 206–208, Apr. 1, 1943.

ALEXANDER, W. B., AND RADFORD, M. C. Scarce birds at Lundy Devon. Brit. Birds, **36** (7): 140, Dec. 1, 1942.

ALLEN, FRANCIS H. More about Boston Killdeers. Bull. Mass. Aud. Soc., **26** (7): 190, Nov., 1942.

[1] Mosby, Henry S., and Handley, Charles O. 'The Wild Turkey in Virginia.' 8vo, xx + 281, pls. I, II (col.), figs. 1–68 (1 fold.), 4 vignettes, 1943. Pittman-Robertson Projects—Division of Game and Inland Fisheries, Richmond, Virginia.

ALMQUIST, H. J., AND ASMUNDSON, V. S. Relation of quality of animal protein concentrate in the diet to growth of poults. Poultry Sci., **22** (3): 265–266, May, 1943.

ALMQUIST, H. J., KRATZER, F. H., AND MECCHI, E. Further experiments on creatine formation in the chick. Jour. Biol. Chem., **148** (1): 17–34, figs. 1–8, Apr., 1943.

ALLNUTT, A. C. British birds in West Africa. Country-side, (n. s.) **12** (5): 85–86, Dec., 1942.

AMADON, DEAN. Specialization and evolution. Amer. Nat., **77** (769): 133–141, Mar.–Apr., 1943.

AMSLER, MAURICE. War and our aviaries. Avic. Mag., (5) **8** (2): 43–45, Mar.–Apr., 1943.

ANONYMOUS. Audubon on the Ohio. Cardinal, **6** (1): 7–10, Jan., 1943.

ANONYMOUS. Bird List. Report Marlborough College Nat. Hist. Soc. for **1942**: 8–10, 1943.

ANONYMOUS. Lessons taught in the zoo. Wild mothers. **Zoonooz, 15** (12): 3–5, 2 figs., Dec., 1942.

ANONYMOUS. Kookaburra. Zoonooz, **16** (3): 3, 4, 1 fig., Mar., 1943.

ANONYMOUS. The Wild Turkey. Wyoming Wild Life, **8** (6): 6, 19–20, 1 fig., June, 1943.—Merriam's Turkey introduced and becoming established in Wyoming.

ANDERSON, HARRY G., FEENEY, WILLIAM S., SPERRY, THEODORE M., AND CATENHUSEN, JOHN. Birds of the University of Wisconsin arboretum. Trans. Wis. Acad. Sci. Arts and Lett., **34**: 5–22, fig. 1, 1942.

ARMSTRONG, ELEANOR O. Common Eiders breeding in East Caithness. Brit. Birds, **36** (6): 114, Nov. 2, 1942.

ARMSTRONG, VIRGINIA. Seen from an observation post. Bull. Mass. Aud. Soc., **27** (1): 7–9, 1 fig., Feb., 1943.

ARTHUR, EDMUND W. American Egret in Allegheny County. Cardinal, **6** (1): 18–19, Jan., 1943.

ARTHUR, EDMUND W. Night Heron belated. Cardinal, **6** (1): 19, Jan., 1943.

BAILEY, S. WALDO. Bird highlights at the Pleasant Valley Sanctuary. Bull. Mass. Aud. Soc., **27** (1): 3–4, Feb., 1943.

BAILLIE, J. L., JR. Nests. Canad. Nature, **5** (3): 94–95, 10 figs., May–June, 1943.

BAKER, E. C. STUART. Information wanted re cuckoos. Jour. Bengal Nat. Hist. Soc., **17** (2): 53–56, Oct., 1942.

BARNES, J. A. G. Reed-warblers in n. Lancashire. Brit. Birds, **36** (7): 141, Dec. 1, 1942.

BARTLETT, T. L. The changing London gulls. Country-side, (n. s.) **12** (5): 93–95, Dec., 1942.

BÄSECKE, KURT. Ueber die Stimme der Weidenmeise. Orn. Monatsber., **50** (2): 59, Mar.–Apr., 1942.

BATTEN, THOS. A. The Rock Martin (*Ptyonoprogne fuligula*). Ostrich, **13** (4): 238–239, Feb., 1943.

BAUMGRAS, PHILIP S. Winter food productivity of agricultural land for seed-eating birds and mammals. Jour. Wildl. Manag., **7** (1): 13–18, figs. 1–2, Jan., 1943.

BEER, JAMES. Food habits of the Blue Goose. Jour. Wildl. Manag., **7** (1): 32–44, figs. 1–4, Jan., 1943.

BEEVER, GEORGE. Fancy pheasants. Part III. Game Breed. and Sports., **48** (4): 38–39, 2 figs., Apr., 1943.

BENNETT, MARY A. Effect of testosterone propionate on territoriality in flocks of Ring Doves. Trans. Ill. State Acad. Sci., **35** (2): 193–194, Dec., 1942.

BENGSTON, BENNIE. The birds of the Bible. Frontiers, **7** (4): 100–102, Apr., 1943.

BENSON, C. W. A new species and ten new races from southern Abyssinia. Bull. Brit. Orn. Club, **63** (444): 8–19, Nov. 20, 1942.—*Hirundo megaensis Vinago waalia jubaensis, Anthus caffer australoabyssinicus, Mirafra poecilosterna australoabyssinicus, Turdus tephronotus australoabyssinicus, Erythropygia leucoptera pallida, Zosterops senegalensis australoabyssinicus, Anthreptes collaris djamdjamensis, Passer griseus tertale, Passer griseus jubaensis,* and *Pseudonigrita arnaudi australoabyssinicus.*

BENSON, C. W. A new warbler from Nyasaland. Ostrich, **13** (4): 241–243, Feb., 1943.—*Eremomela* (*Magalilais*) *usticollis rensi,* new subspecies.

BENTHAM, HOWARD. Turtle-dove using same nest for two years in succession. Brit. Birds, **36** (8): 163, Jan. 1, 1943.

BERRY, E. P., CARRICK, C. W., ROBERTS, ROY E., AND HAUGE, S. M. Whey solubles as a source of growth factors in chick rations. Poultry Sci., **22** (3): 252–263, May 1943.

BERRY, G. F. White Stork migrations. Ostrich, **13** (4): 239–240, Feb., 1943.

BEVAN, G. Some notes from Oudtshoorn. Ostrich, **13** (4): 235–238, Feb., 1943.

BIRD, H. R. Increasing yellow pigmentation in shanks of chickens. Poultry Sci. **22** (3): 205–208, fig. 1, May, 1943.

BLAIR, FRANK D. Food plantings for game birds. Conserv. Volunt., **6** (31): 13–15, Apr., 1943.

BLACKFORD, JOHN LINDSEY. Birds of our gardens. Nature Mag., **36** (4): 189–190, 3 figs., Apr., 1943.

BLESS, ARTHUR A., AND ROMANOFF, ALEXIS L. Stimulation of the development of the avian embryo by X-rays. Jour. Cell. and Compar. Physiol., **21** (2): 117–121, fig. 1, Apr., 1943.

BLEZARD, ERNEST. A Cumberland Magpie roost. Brit. Birds, **36** (10): 200, Mar. 1, 1943.

BOEHM, ERHARD F. Bilateral ovaries in Australian hawks. Emu, **42** (4): 251, Apr., 1943.

BOETTICHER, HANS VON. Was ist "Cygnus davidi Swinh."? Zool. Anz., **138** (3–4): 71–85, figs. 1–7, May 1, 1943.—Considered to be a hybrid between a goose and a swan of uncertain species.

BOYDEN, ALAN. Serology and animal systematics. Amer. Nat., **77** (770): 234–255, figs. 1–3, May–June, 1943.—Discussion of photronreflectometer tests indicating that they can supply a "yardstick" for the delimitation of systematic categories.

BRACKBILL, HERVEY. Birds' food in northwest Baltimore. Bull. Nat. Hist. Soc. Maryland (mimeogr.), **13** (1): 5–10, Sept.–Oct., 1942.

BRADT, GEORGE MCCLELLAN. All in the life of a Swainson Hawk. Nature Mag., **36** (5): [249–254], 10 figs., May, 1943.

BRADT, GEORGE MCCLELLAN. Winged hunter of the desert. Desert Mag., **6** (7): 5–8, 4 figs., May, 1943.—An experiment in falconry.

BRIGGS, G. M., JR., LUCKEY, T. D., ELVEJHEM, C. A., AND HART, E. B. Studies on two chemically unidentified water-soluble vitamins necessary for the chick. Jour. Biol. Chem., **148** (1): 163–172, Apr., 1943.

BRINKMANN, W. *Falco vespertinus* L., Abendfalken im Emslande. Orn. Monatsber., **50** (2): 59–60, Mar.–Apr., 1942.

BRINKMANN, W. Zum Zuge von *Tringa erythropus* im Emslande. Orn. Monatsber., **50** (2): 58–59, Mar.–Apr., 1942.

BRINKMANN, W. Zwergschwäne auf der Ems. Orn. Monatsber., **50** (2): 59, Mar.–Apr., 1942.

BROEKHUYSEN, G. J., AND MEIKLEJOHN, M. F. M. Palaearctic waders in south and middle Africa. Ostrich, **13** (4): 203–211, Feb., 1943.

BROEKHUYSEN, G. J., AND TAYLOR, J. S. Some birds observed at Lake Mentz. Ostrich, **13** (3): 157–160, Sept., 1942.

BROOKS, ALLAN. Birds of Canada. Canad Nature, **5** (3): 110–111, 4 figs. (col.), May–June, 1943.—Ruby-throated Hummingbird, Rufous Hummingbird, Red-shouldered Hawk, and Ferruginous Rough-leg Hawk in color, with short accompanying text.

BROOKS, MAURICE. West Virginia bird notes. Cardinal, **6** (1): 16–17, Jan., 1943.

BROOKS-KING, M. Song form in the thrush family. Brit. Birds, **36** (5): 82–85, Oct. 1, 1942.

BROOKS-KING, M. Unusual feeding method of nuthatch. Brit. Birds, **36** (5): 94, Oct. 1, 1942.

BROUN, MAURICE. A longevity record of a Slate-colored Junco. Bird-Band., **14** (1, 2): 46, Jan., Apr., 1943.—At least eleven years.

BROWN, GEORGE. Aggressive display of birds before a looking-glass. Brit. Birds, **36** (8): 160–161, Jan. 1, 1943.

BRUNER, S. C. Notas ornitologicas. Mem. Soc. Cub. Hist. Nat. "Felipe Poey," **17** (1): 19–21, Apr., 1943.—Notes from Cuba.

BRYANT, C. E. Birds and the bush. Victor. Nat., **59** (11): 182–184, Mar., 1943.

BRYENS, OSCAR MCKINLEY. A Belted Kingfisher recovery. Bird-Band., **14** (1, 2): 44, Jan., Apr., 1943.

BRYENS, OSCAR MCKINLEY. A Cedar Waxwing recovery. Bird-Band.. **14** (1, 2): 46, Jan., Apr., 1943.

BRYENS, OSCAR MCKINLEY. A Northern Blue Jay in its ninth winter. Bird-Band., **14** (1, 2): 45–46, Jan., Apr., 1943.

BUCKNER, G. DAVIS, INSKO, W. M., JR., AND HARMS, AMANDA. Does boiling change the weight of an egg or of the yolk or white? Poultry Sci., **22** (1): 95, Jan., 1943.

BUCKNER, G. DAVIS, INSKO, W. M., JR., AND HARMS, AMANDA. Spring bluegrass versus mature bluegrass as pasture for laying hens. Poultry Sci., **22** (3): 248–251, May, 1943.

BUECKER, ELMER D. Intracentral and peripheral factors in the differentiation of motor neurons in transplanted lumbo-sacral spinal cords of chick embryos. Jour. Exper. Biol., **73** (1): 99–129, pls. 1–2, figs. 1–5, June, 1943.

BULLOUGH, W. S. Observations on the colonies of the Arctic Tern (*Sterna macrura* Naumann) on the Farne Islands. Proc. Zool. Soc. London, **(A) 112**: 1–12, pl. 1, figs. 1–2, Sept., 1942.

BULLOUGH, W. S. The Starling (*Sturnus vulgaris* L.) and foot-and-mouth disease. Proc. Roy. Soc., (Ser. B., Biological Sciences) **131** (no. 862): 1–12, figs. 1–9, Sept. 14, 1942.

BURKHART, L. R. The bird-housing problem. Wyo. Wild Life, **8** (3): 1–3, 14, 1 fig., Mar., 1943.

BUTTON, J. Grey Kestrel. (*Dissodectes dickinsoni*). Ostrich, **13** (3): 169–172, Sept., 1942.

CAMPBELL, A. G. Australian faunal regions. Emu, **42** (4): 242–245, 1 fig., Apr., 1943.

CAMPBELL, BRUCE, AND DONCASTER, L. HUGH. Notes on some Monmouthshire birds. Brit. Birds, **36** (10): 198–199, Mar. 1, 1943.

CAMPBELL, WALTER S. The English Sparrow in Australia. Victor. Nat., **60** (1): 9–11, May 6, 1943.

CARR-LEWTY, R. A. An unrecorded Yorkshire heronry. Brit. Birds, **36** (11): 226–227, Apr. 1, 1943.

CARR-LEWTY, R. A. Reactions of birds to aircraft. Brit. Birds, **36** (8): 151–152, Jan. 1, 1943.

CARR-LEWTY, R. A. The aerodynamics of the drumming of the Common Snipe. Brit. Birds, **36** (12): 230–234, figs. 1–5, May 1, 1943.

CARY, R. M. Birds of the dongas. Ostrich, **13** (3): 161–164, Sept., 1942.

CASH, JAMES. The war-time value of birds. The Field, **181** (no. 4704): 187, 1 fig., Feb. 20, 1943.

CHAPMAN, FLOYD B. The red squirrel and the birds. Cardinal, **6** (1): 6, Jan., 1943.

CHATELANAT, C. A. Tichodroma muraria (L.). Le Tichodrome niche au bord du Leman. Nos Oiseaux, no. **164**: 196–197, 1 fig., Oct., 1942.

CHENEY, ROBERT F. There are birds for the stamp collector. Bull. Mass. Aud. Soc., **26** (9): 227–229, pl., Jan., 1943.

CHRISTY, BAYARD H. A Song Sparrow's nest. Cardinal, **6** (1): 23–24, Jan., 1943.

CHRISTY, BAYARD H. Bird portraiture. Cardinal, **6** (1): 11–13, Jan., 1943.

CLANCEY, P. A. A new race of Meadow-pipit. Bull. Brit. Orn. Club, **63** (no. 444): 6–7, Nov. 20, 1942.—*Anthus pratensis whistleri* from near Dornoch, northern Scotland.

CLANCEY, P. A. On the exact type-locality of *Sitta europaea affinis* Blyth, 1846. Bull. Brit. Orn. Club, **63** (446): 56–57, Mar. 10, 1943.

CLANCEY, P. A. Some supplementary notes on *Emberiza citrinella calignosa* Clancey, 1940. Bull. Brit. Orn. Club, **63** (446): 57, Mar. 10, 1943.

CLANCEY, P. A. The continental Chaffinch in Wiltshire. Bull. Brit. Orn. Club, **63** (446): 57, Mar. 10, 1943.

CLARK, CATHERINE. Concerning small birds. The Field, **181** (no. 4706): 243, 3 figs., Mar. 6, 1943.

CLARKE, W. J. White-tailed Eagle in Yorkshire. Brit. Birds, **36** (8): 161, Jan. 1, 1943.

CLAY, GERVAS. Livingstone in north eastern Rhodesia. Ostrich, **13** (4): 227–231, Feb., 1943.—Ornithological notes from the journals of a famous explorer.

CLAY, THERESA. Genera and species of Mallophaga occurring on Gallinaceous hosts. P. Z. S. London, (B), **110**: 1–120, figs. 1–79, July, 1940.

CLELAND, J. B., AND FRANCIS, L. S. Further notes on early ornithology in south and central Australia. So. Austr. Ornith., **16** (4): 41–43, Dec., 1942.

CLEMENTSON, GEORGE. On the appearance, nesting, and breeding of Fulmarus g. glacialis (L.) in the Isle of Man. North West. Nat., **17** (3): 247–248, Sept., 1942.

CLEMENTSON, GEORGE. On the occurrence of Coccothraustes c. coccothraustes (L.) and Fringilla montifringilla L. in the Isle of Man. North West. Nat., **17** (3): 249, Sept., 1942.

COFFEY, BEN B., JR. Post-juvenal migration of herons. Bird-Band., **14** (1, 2): 34–39, fig., Jan., Apr., 1943.

COLE, CHESTER. Lead and ducks. Wis. Conserv. Bull., **8** (4): 17–18, Apr., 1943.

COLLINGE, WALTER E. Wild birds and home-grown food in Britain. Nature, **151** (no. 3822): 128–129, Jan. 30, 1943.

COLQUHOUN, M. K. Visual and auditory conspicuousness in a woodland bird community: a quantitative analysis. Proc. Zool. Soc. London, (A) **110**: 129–148, Mar., 1941.

CONDON, H. C., AND CLELAND, J. B. Additions and corrections to the list of the birds of South Australia. So. Austr. Ornith., **16** (4): 36, 45, Dec., 1942.

COOKE, C. H. Curious behavior of Carrion Crows. Brit. Birds, **36** (6): 112, Nov. 2, 1942.

CORDIER, CHARLES. The Umbrella Bird (*Cephalopterus ornatus glabricollis*). Aviculture **13** (2): 21–22, cover fig., Mar.–Apr., 1943.

COURSE, H. A., CHANDLER, K. R., AND RIDLEY, M. W. "Injury-feigning" of Wood-pigeon. Brit. Birds, **36** (8): 162, Jan. 1, 1943.

COURTNAY-LATIMER, (MISS) M. The Ground Hornbill (*Bucorvus cafer*). Ostrich, **13** (3): 121–136, 18 figs., Sept., 1942.

CRAVENS, W. W., SEBESTA, E. E., HALPIN, J. G., AND HART, E. B. Effect of vitamin B_6 on egg production and hatchability. Poultry Sci., **22** (1): 94–95, Jan., 1943.

CUSACK, (MISS) E. B. The Crowned Crane (*Balearica regulorum*). Ostrich, **13** (4): 212–218, 6 figs., Feb., 1943.

DAVIS, MALCOLM. Bird notes from Washington's zoo. Aviculture, **13** (2): 38, Mar.–Apr., 1943.

DAVIS, MALCOLM. Quetzals at Washington zoo. Aviculture, **12** (6): 336, Nov.–Dec., 1942.

DELACOUR, J. A collection of birds from Costa Rica. Avic. Mag., (5) **8** (2): 29–32, 1 pl., Mar.–Apr., 1943.

DELACOUR, JEAN. A revision of the genera and species of the family Pycnonotidae (Pulbuls). Zoologica, **28** (1): 1–28, pls. 1–2, figs. 1–13, May 4, 1943.—Genera and subgenera are diagnosed and the full species listed with their respective ranges. The plates give photographs of living individuals of six species.

DELACOUR, J. Game birds. Aviculture, **13** (2): 23–24, Mar.–Apr., 1943.

DELACOUR, J. Game birds. Ruffed, Long-tailed and true Pheasants. Aviculture, **12** (6): 332–333, Nov.–Dec., 1942.

DELACOUR, JEAN. Substitute diets for insectivorous and frugivorous birds. Aviculture, **12** (6): 337–338, Nov.–Dec., 1942.

DELACOUR, JEAN. Substitute diets for insectivorous and frugivorous birds. Avic. Mag., (5) **8** (2): 50–52, Mar.–Apr., 1943.

DELACOUR, JEAN. Two new subspecies of *Pycnonotus cafer*. Zoologica, **28** (1): 29–30, fig. 1, May 4, 1943.—*P. c. schauenseei* from west-central Siam and *P. c. deignani* from southeastern Siam.

DISNEY, H. J., AND STOKOE, R. Blue-headed Wagtails in Staffordshire. Brit. Birds, **36** (6): 113, Nov. 2, 1942.

DONAGHO, WALTER. Bird notes from Guadalcanal. Elepaio (mimeogr.), **3** (9): 32–33, Mar., 1943; **3** (10): 35–36, Apr., 1943.

DOUNCE, ALEXANDER L., AND TIEN HO LAN. Isolation and properties of chicken erythrocyte nuclei. Science, **97** (no. 2530): 584–585, June 25, 1943.

DOYLE, L. P., SEARCY, G. L., AND ANDREWS, F. N. A pathological condition of the fowl testis. Poultry Sci., **22** (2): 188–189, fig. 1, Mar., 1943.

DROST, R. [Kuckuck als Tagzügler.] Vogelzug, **13** (1–2): 63, Jan.–Apr., 1942.

DUMOND, (MRS.) F. L. Returns on juncos at Grand Rapids, Michigan. Inland Bird Band. News (mimeogr.), **15** (3): 18, June, 1943.

EALES-WHITE, MAJOR J. C. Nature in war-time. Country-side, (n. s.) **12** (5): 96–98, Dec., 1942.

EASTLICK, HERBERT L. Studies on transplanted embryonic limbs of the chick. I. The development of muscle in nerveless and in innervated grafts. Jour. Exper. Biol., **73** (1): 27–49, pls. 1–2, June, 1943.

EDGE, ROSALIE. Conservation for victory. Emergency Conserv. Comm., Ann. Rept, **1942**: 1–28, 1943.

EDGE, ROSALIE. Ducks and the democracy. Emerg. Conserv. Comm., Publ. **87**: [1–16], 1942.

EDWARDS, YORK. The House Wren. Canad. Nature, **5** (3): 88–90, 9 figs., May–June, 1943.

ELLIS, JOHN C. S. Unusual birds in N. Lancashire. Brit. Birds, **36** (5): 95–96, Oct. 1, 1942.

EMEIS, W. Winterbeobachtungen (Januar-Februar 1942) im Flensburger Hafen.—Vermutlicher Fall der Winterortstreue bei der Schnatterente (*Anas strepera* L.). Vogelzug, **13** (1–2): 60–61, Jan.–Apr., 1942.

EVANS, HIRAM J. The independent differentiation of the sensory areas of the avian inner ear. Biol. Bull., **84** (3): 252–262, pl. 1, June, 1943.

EVANS, ROBERT JOHN. The choline requirements of turkey poults. Poultry Sci., **22** (3): 266–267, May, 1943.

EVANS, ROBERT JOHN, RHIAN, MORRIS, AND DRAPER, CARROLL I. Perosis in turkey poults and the choline content of their diet. Poultry Sci., **22** (1): 88–93, Jan., 1943.

EZRA, ALFRED. Notes from Foxwarren Park for 1942. Avic. Mag., (5) **8** (2): 49–50, Mar.–Apr., 1943.

FARNER, DONALD S. Gastric hydrogen ion concentration and acidity in the domestic fowl. Poultry Sci., **22** (1): 79–82, fig. 1, Jan., 1943.

FISHER, James. Willow-Tits and Wood-Warblers in west Ross-shire. Brit. Birds, **36** (5): 93–94, Oct. 1, 1942.

FITTER, R. S. R. Status of the Black-backed Gulls in the London area. Brit. Birds, **36** (8): 163–164, Jan. 1, 1943.

FLEETWOOD, RAYMOND J. Chimney Swift roosting in well. Bird-Band., **14** (1, 2): 44, Jan., Apr., 1943.

FLEMING, C. A. Notes on the life history of the Silver-eye based on colour-banding. Emu, **42** (4): 193–217, pl. 18, figs. 1–9, Apr., 1943.

FORD, EDWARD R. The bird collection of the Chicago Academy of Sciences. Chicago Nat., **6** (2): 37–40, June, 1943.

FRAPS, RICHARD M., HERTZ, R., AND SEBRELL, W. H. Relation between ovarian function and avidin content in the oviduct of the hen. Proc. Soc. Exper. Biol. and Med., **52** (2): 140–142, Feb., 1943.

FRIEDMANN, HERBERT. A new race of the sharp-tailed grouse. Jour. Wash. Acad. Sci., **33** (6): 189–191, June 15, 1943.—*Pedioecetes phasianellus caurus* from Fairbanks, Alaska. A key to the various forms of the species is included in the account.

FUNK, E. M. The relative efficiency of gains in weight made by male and female bronze turkeys. Poultry Sci., **22** (1): 3–10, figs. 1–4, Jan., 1943.

GARRISON, DAVID L. Birds in northern Ireland. Bull. Mass. Aud. Soc., **27** (5): 133–138, 3 figs., June, 1943.

GARRISON, DAVID L. May week on the North Atlantic. Bull. Mass. Aud. Soc., **26** (8): 203–206, 2 figs., Dec., 1942.

GAZIN, C. LEWIS. The Late Cenozoic vertebrate faunas from the San Pedro Valley, Ariz. Proc. U. S. Nat. Mus., **92** (no. 3155): 475–518, pls. 42–43, figs. 39–47, 1942.—Largely mammalian; birds listed on pp. 479–480.

GÉROUDET, P. Le Jaseur boréal en Suisse pendand l'hiver 1941–42. Nos Oiseaux, no. **164**: 185–192, 3 figs., Oct., 1942.

GÉROUDET, P., AND BLUMENSTEIN, E. Le Héron pourpré niche en Suisse. Nos Oiseaux, no. **160**: 120–129, figs., 1–5, 1 fig., Feb., 1942.

GIBSON-HILL, C. A. North Keeling Islands. Their bird life and vegetation. The Field, **181** (no. 4704): 194–195, 8 figs., Feb. 20, 1943.

GLADSTONE, HUGH. Comparative prices of game and wildfowl in 1512, 1757, 1807, 1922, 1941 and 1942. Brit. Birds, **36** (7): 122–131, Dec. 1, 1942.

GODFREY, ROBERT. The South African Cliff Swallow. Ostrich, **13** (4): 219–226, Feb., 1943.

GRACEWSKI, J. J., AND SCOTT, H. M. The influence of time of mating on fertility. Poultry Sci., **22** (3): 264–265, May, 1943.

GRANT, C. H. B., AND MACKWORTH-PRAED, C. W. A new race of Violet-backed Starling from Arabia. Bull. Brit. Orn. Club, **63** (444): 7, Nov. 20, 1942.—*Cinnyricinclus leucogaster arabicus* from Hajeilah, Yemen, Arabia.

GRANT, C. H. B., AND MACKWORTH-PRAED, C. W. Extension of distribution of *Heteropsar acuticauda* (Bocage), Jorn. Lisboa, ii. 1870, p. 345: Huilla, Angola. Bull. Brit. Orn. Club, **63** (446): 58, Mar. 10, 1943.

GRANT, C. H. B., AND MACKWORTH-PRAED, C. W. Notes on eastern African birds. Bull. Brit. Orn. Club, **63** (444): 19–28, Nov. 20, 1942.—A series of ten notes.

GRANT, C. H. B., AND MACKWORTH-PRAED, C. W. Notes on Eastern African birds. Bull. Brit. Orn. Club, **63** (446): 49–56, Mar. 10, 1943.—Six subtitles.

GREEN, JAMES. Crossbills. North West. Nat., **17** (3): 248–249, Sept., 1942.

GREGORY, T. C., AND HALE, JAMES R. Varieties of Blue-headed Wagtails breeding in Kent. Brit. Birds, **36** (6): 112–113, Nov. 2, 1942.

GRESHAM, H. H. Wrens and robins. Aviculture, **13** (2): 28, Mar.–Apr., 1943.

GREW, E. S. The life and economics of the Rook. Illus. London News, **112** (no. 2922): 468, 3 figs., Apr. 24, 1943.

GRICE, DANIEL AND DAVID. Tenants of an old stub. Bull. Mass. Aud. Soc., **26** (7): 177–184, 8 figs., Nov., 1942.

GRIFFIN, DONALD R. Homing experiments with Herring Gulls and Common Terns. Bird-Band., **14** (1, 2): 7–33, figs. 1–4, Jan., Apr., 1943.—Some interesting experiments here recorded. One important case covers birds carried 250 miles away and released at same place on two successive years. The return the first year was slow; that in the following year was much faster, possibly owing to recognition of previously learned landmarks.

GRIMES, S. A. Birds of Duval County. Florida Nat., **16** (3): 29–34, 4 figs., [the third is certainly mislabeled], Apr., 1943.—Beginning an annotated list; to be continued.

GRISCOM, LUDLOW. Notes on the Pacific Loon. Bull. Mass. Aud. Soc., **27** (4): 106-109, 1 fig., May, 1943.

GROSKIN, HORACE. Banding record 1/1/42 to 12/31/42 inclusive at Ardmore, Pa. station. Cassinia, **32**: 44, June, 1943.

GROSS, JULIUS. Seidenreiher oder Kuhreiher. Orn. Monatsber., **50** (2): 56, Mar.–Apr., 1942.

GROTE, H. Zur Kenntniss des Zuges von *Limosa lapponica* (L.). Orn. Monatsber., **50** (2): 56–57, Mar.–Apr., 1942.

GUTOWSKA, MARIE S., PARKHURST, RAYMOND T., PARROTT, E. M., AND VERBURG, R. M. Alkaline phosphatase and egg formation. Poultry Sci., **22** (3): 195–204, fig. 1, May, 1943.

HAINARD, R. Un Faucon kobez près de Bernex. Nos Oiseaux, no. **164**: 192–193, 1 fig., Oct., 1942.

HAINES, LAWRENCE C. Unusual nest of King Quails. Emu, **42** (4): 252, Apr., 1943.

HAINES, R. WHEELER. The evolution of epiphyses and of endochondral bone. Biol. Rev. of Cambr. Philos. Soc., **17** (4): 267–291, figs. 1–10, Oct., 1942.—In part relates to birds, including 'Cartilage canals and pneumatization in birds,' pp. 286–288.

HAMMOND, EDWARD K. Some unusual bird nesting records for the Chicago region. Chicago Nat., **6** (2): 41, 44, June, 1943.

HAMPE, IRVING E. Red Crossbills in Maryland. Bull, Nat. Hist. Soc. Maryl., **12** (5): 75, May–June, 1942.

HAMPTON, J. F. The Swan as English food. The Field, **181** (no. 4704): 198, Feb. 20, 1943.

HANSON, W. A. A Cumberland bird-sanctuary. Country-side, (n. s.) **12** (5): 90–92, Dec., 1942.

HARDY, A. D. Addled eggs and thunderstorms. Victor. Nat., **59** (11): 196, Apr., 1943.

HARKNESS, R. Green Sandpiper attacked by Lapwing. Brit. Birds, **36** (6): 117, Nov. 2, 1942.

HARRISON, HAL H. Abnormally colored tanager. Cardinal, **6** (1): 21, Jan., 1943.—Male Scarlet Tanager (June 27) orange instead of red; wings and tail normally black.

HARRISON, HAL H. Pied-billed Grebe on the Allegheny River. Cardinal, **6** (1): 18, Jan., 1943.

HARRISON, JAMES M. Bird notes from Lincolnshire, 1934–1942. Brit. Birds, **36** (11): 222–224, Apr. 1, 1943.

HARRISON, JAMES M. Continental Redshank in Kent. Brit. Birds, **36** (8): 163, Jan. 1, 1943.

HARSHAW, H. M., KELLOGG, W. L., RECTOR, R. R., AND MARSDEN, S. J. The composition of turkeys of different varieties and strains. Poultry Sci., **22** (2): 126–136, figs. 1–2, Mar., 1943.

HARTHAN, A. J. Marsh-tits and Wood-pigeons feeding upon plum blossom. Brit. Birds, **36** (7): 141, Dec. 1, 1942.

HAYS, F. A. Egg production versus reproduction in Rhode Island Reds. Poultry Sci., **22** (2): 111–122, Mar., 1943.

HEIMAN, VICTOR, AND TIGHE, L. W. Observations on the shank pigmentation of chicks. Poultry Sci., **22** (2): 102–107, figs., 1–5, Mar., 1943.

HENDERSON, E. W., AND HATHAWAY, H. E. A method of measuring pulse rate of domestic fowl. Poultry Sci., **22** (1): 44–46, figs. 1–2, Jan., 1943.

HENDY, E. W. Sexual behavior of Chaffinches while feeding fledglings. Brit. Birds, **36** (8): 161, Jan. 1, 1943.

HERMAN, CARLTON M., CHATTIN, JOHN E., AND SAARNI, ROY W. Food habits and intensity of coccidian infection in native Valley Quail in California. Jour. Parasitol., **29** (3): 206–208, fig. 1, June, 1943.

HERTER, WOLF-RAINER. Eine spottende Blaumeise. Orn. Monatsber., **50** (2): 51–53, Mar.–Apr., 1942.

HERTZ, R., FRAPS, R. M., AND SEBRELL, W. H. Induction of avidin formation in the avian oviduct by stilbestrol plus progesterone. Proc. Soc. Exper. Biol. and Med., **52** (2): 142–144, Feb., 1943.

HEUSER, G. F. Corn and wheat as the main part of laying rations. Poultry Sci., **22** (2): 123–125, Mar., 1943.

HEUSER, G. F., NORRIS, L. C., MCGINNIS, JAMES, AND SCOTT, M. L. Further evidence of the need for supplementing soybean meal chick rations with phosphorus. Poultry Sci., **22** (3): 269–270, May, 1943.

HIGBY, WARREN. Notes on the Goshawk. Wyoming Wild Life, **7** (12): 10–12, 1 fig., Dec., 1942.

HILL, W. C. OSMAN. Experiences with the Brown Wood Owl (*Strix indranee indranee* Sykes). Avic. Mag., (5) **8** (2): 46–48, Mar.–Apr., 1943.

HINSHAW, W. R., AND MCNEIL, E. *Leucocytozoon* sp. from turkeys in California. Poultry Sci., **22** (3): 268–269, May, 1943.

HOLLOM, P. A. D. Redshanks swimming. Brit. Birds, **36** (7): 142, Dec. 1, 1942.

HONIGMANN, H. The number conception in animal psychology. Biol. Rev. of Cambr. Philos. Soc., **17** (4): 315–337, figs. 1–2, Oct., 1942.—A review of experiments to determine the ability of animals to "count," including various birds.

HOPKINSON, E. Breeding records to date (cont.). Avic. Mag., (5) **7** (6): 161–168, Nov.–Dec., 1942.

HOPKINSON, E. Breeding records to date. Part VII (cont.). Avic. Mag., (5) **8** (2): 39–42, Mar.–Apr., 1943.

HOSKING, ERIC J. British woodpeckers at their nesting holes. Field, **181** (no. 4712): 402–403, 12 figs., Apr. 17, 1943.—A series of photographs.

HOSKING, ERIC J. Incubation of the Jay. Brit. Birds, **36** (6): 112, Nov. 2, 1942.

HOSKING, ERIC J. Some observations on the Marsh Harrier. Brit. Birds, **37** (1): 2–9, pls. 1–4, June 1, 1943.

HURLBURT, W. E. Mannikins (cont.). Aviculture, **12** (6): 328–330, Nov.–Dec., 1942.

HUTT, F. B., AND MUELLER, C. D. Independent identical mutations to albinism in the sex chromosome of the fowl. Amer. Nat., **77** (no. 769): 181–184, Mar.–Apr., 1943.

HUXLEY, JULIAN S. Genetic interaction in a hybrid pheasant. Proc. Zool. Soc. London, (A) **111**: 41–43, pl. 1, Sept., 1941.

HUXLEY, JULIAN S. On the habit of brooding on the perch in birds. Proc. Zool. Soc. London, (A) **111**: 37–39, pl. 1, Sept., 1941.

HUXLEY, J. S., AND BOND, F. W. The display of Rheinart's Pheasant (*Rheinardia ocellata*). Proc. Zool. Soc. London, (A) **111**: 277–278, pl. 2, Feb., 1942.

HUXLEY, J. S., AND FISHER, JAMES. Hostility reactions in Black-headed Gulls. Proc. Zool. Soc. London, (A) **110**: 1–10, pls. 1–2, Sept., 1940.

INGLIS, C. M. Records of some rare or uncommon geese, ducks and other water birds in N. Behar (cont.). Jour. Bengal Nat. Hist. Soc., **17** (2): 56–58, Oct., 1942.

INGLIS, CHAS. M. The Brown Bullfinch (*Pyrrhula nipalensis nipalensis* Hodgs.) at low levels. Jour. Bengal Nat. Hist. Soc., **17** (2): 77, Oct., 1942.

[INGLIS, C. M.] The Indian Paradise Flycatcher. Jour. Bengal Nat. Hist. Soc., **17** (2): 50–52, pls. 5–6 (by W. A. S. Lewis), Oct., 1942.

IREDALE, TOM, AND WHITLEY, GILBERT., Plain dwellers and mound builders. The *Pedionomus* puzzle. Emu, **42** (4): 246–249, Apr., 1943.

IRWIN, M. RICHARD. Compensatory hypertrophy of a single kidney in the domestic fowl. Poultry Sci., **22** (3): 270–271, May, 1943.

IRWIN, M. R., AND CUMLEY, R. W. Immunogenetic studies of species relationships. Amer. Nat., **77** (770): 211–233, fig. 1, May–June, 1943.—Genetic relationships and differences of different species indicated by studies of antigens.

JACKSON, WINIFRED T. Song Sparrows raise young Cowbird. Bull. Mass. Aud. Soc., **27** (4): 114, May, 1943.

JAAP, R. GEORGE. Strains of White Plymouth Rocks for specific economic purposes. Poultry Sci., **22** (3): 209–217, May, 1943.

JAAP, R. GEORGE, PENQUITE, ROBERT, AND THOMPSON, R. B. Body form in growing chickens. II. Growth of Cornish bantams. Poultry Sci., **22** (1): 11–19, figs. 1–4, Jan., 1943.

JEFFREY, F. P., AND PINO, J. The effects of heredity and of certain environmental factors on the incidence of blood spots in chicken eggs. Poultry Sci., **22** (3): 230–234, May, 1943.

JONES, D. G., AND LAMOREUX, W. F. Estimation of size of comb on live fowl. Endocrinol., **32** (4): 356–360, Apr., 1943.

KELKER, GEORGE HILLS. A winter wildlife census in northeastern Wisconsin. Jour. Wildl. Manag. **7** (2): 133–141, Apr., 1943.

KEMMERER, A. R., AND FRAPS, G. S. Note on a green pigment in the fat of a chicken. Poultry Sci., **22** (2): 189, Mar., 1943.

KEMP, A. PERCY. Bird queries. Emu, **42** (4): 249–250, Apr., 1943.

KERSHAW, J. A. Concerning a rare parrot. Victor. Nat., **59** (11): 196, Apr., 1943.—*Geopsittacus occidentalis* in New South Wales?

KESTEVEN, H. LEIGHTON. The ossification of the avian chondrocranium, with special reference to that of the Emu. Proc. Linn. Soc. N. S. Wales, **67** (3, 4): 213–237, figs. 1–18, 1942.

KESTEVEN, H. LEIGHTON. The ossification of basisphenoid and presphenoid bones in *Melopsittacus*. Proc. Linn. Soc. N. S. Wales, **67** (5, 6): 349–351, pls. 8–11, figs. 1–2, Dec. 15, 1942.

KINSEY, ERIC CAMPBELL. The breeding of Galapagos Finches in California. Avic. Mag., (5) **7** (5): 125–137, 1 pl., Sept.–Oct., 1942.

KITTAMS, WALTER H. October foods of Ruffed Grouse in Maine. Jour. Wildl. Manag., **7** (2): 231–233, Apr., 1943.

KLEINER, A. Bewegungen des Kernbeissers (*C. coccothraustes*) in Ungarn im Winter 1940/41. Vogelzug, **13** (1–2): 61, Jan.–Apr., 1942.

DE KLERK, W. DE KLERK. Vulturine Fish Eagle in Adelaide District, C. P. Ostrich, **13** (3): 176, Sept., 1942.

KNOX, CHARLES W., QUINN, JOSEPH P., AND GODFREY, ALBERT B. Comparison of Rhode Island reds, white wyandottes, light Sussex, and crosses among them to produce F_1 and three-way cross progeny. Poultry Sci., **22** (1): 83–87, Jan., 1943.

KUHK, R. Ein ehemaliges Brutvorkommen des Zwergsumpfhuhns, *Porzana pusilla* (Pall.), in Mecklenburg. Orn. Monatsber., **50** (2): 49–50, Mar.–Apr., 1942.

KUHK, RUDOLF. Ueber Massenzug des Wespenbussards, *Pernis apivorus* (L.) in Mecklenburg, Oldenburg und der Eifel. Vogelzug, **13** (1–2): 57–58, Jan.–Apr., 1942.

LACK, DAVID. Female Chaffinch in song. Brit. Birds, **36** (11): 225–226, Apr. 1, 1943

LACK, DAVID. The age of some more British birds (to be cont.). Brit. Birds, **36** (10): 193–197, Mar. 1, 1943.

LACK, DAVID. The age of some more British birds. Brit. Birds, **36** (11): 214–221, Apr. 1, 1943.—Continued from earlier number.

LAMOREUX, W. F., HUTT, F. B., AND HALL, G. O. Breeding for low fecundity in the fowl with the aid of the progeny test. Poultry Sci., **22** (2): 161–169, figs. 1–2, Mar., 1943.

LAMOREUX, W. F. The influence of different amounts of illumination upon the body weight of birds. Ecol., **24** (1): 79–84, figs. 1–3, Jan., 1943.—Gains in weight

greatest when daily period of light is inadequate for maximum stimulation of reproduction. Seasonal variations in weight of wild birds attributed in part to normal changes in length of day.

LANDAUER, WALTER, AND BAUMANN, LISBETH. Rumplessness of chicken embryos produced by mechanical shaking of eggs prior to incubation. Jour. Exper. Biol., **73** (1): 51–74, figs. 1–3, June, 1943.

LASHMAR, ALLEN F. C. Nesting activities and notes from the eastern portion of Kangaroo Island for the year 1939. So. Austr. Ornith., **16** (4): 37–40, Dec., 1942.

LASKEY, AMELIA R. The nesting of Bluebirds banded as nestlings. Bird-Band., **14** (1, 2): 39–43, Jan., Apr., 1943.

LAWRENCE, WILLIAM H. A shy Killdeer becomes a very bold bird. Bull. Mass. Aud. Soc., **27** (5): 139, 3 figs., June, 1943.

LEACH, E. P. Avocet ringed in Denmark found in Hampshire. Brit. Birds, **36** (10): 201, Mar. 1, 1943.

LEACH, E. P. Recovery of marked birds. Brit. Birds, **36** (12): 235–240, May 1, 1943.

LERNER, I. MICHAEL, AND TAYLOR, LEWIS W. The inheritance of egg production in the domestic fowl. Amer. Nat., **77** (no. 769): 119–132, Mar.–Apr., 1943.

LESER, FELIX AGNUS. Parrots and peafowl. Aviculture, **13** (2): 31–33, 1 fig., Mar.–Apr., 1943.

LILLIE, FRANK R., AND HSI WANG. Physiology of development of the feather. VI. The production and analysis of feather-chimaerae in fowl. Physiol. Zool., **16** (1): 1–21, pls. 1–5, figs. 1–4, Jan., 1943.

LINCOLN, FREDERICK C. La migración de aves en el Hemisferio Occidental. Bol. Mus. Hist. Nat. 'Javier Prado,' **6** (22, 23): 382–391, 1942.

LIPPERT, W. Herbstzug nach Osten beim Eichelhäer (*Garrulus glandarius* L.). Vogelzug, **13** (1–2): 59, Jan.–Apr., 1942.

LITTLEJOHNS, R. T. Different Cuckoo eggs in same nest. Emu, **42** (4): 250–251, Apr., 1943.

LLOYD, BERTRAM. Report on birds observed in Hertfordshire in 1941. Trans. Hert. Nat. Hist. Soc. and Field Club, **21** (6): 324–337, 1943.

LORENZ, F. W. Fattening cockerels by stilbestrol administration. Poultry Sci., **22** (2): 190–191, Mar., 1943.

LOVELL, HARVEY B. Notes from Louisville, Kentucky. Inland Bird Band. News (mimeogr.), **15** (3): 21, June, 1943.

LOW, G. CARMICHAEL. Birds of inner London. Brit. Birds, **36** (10): 189–192, Mar. 1, 1943.

LOW, G. CARMICHAEL. Unusual behaviour of heron. Brit. Birds, **36** (7): 142, Dec. 1, 1942.

LOW, G. CARMICHAEL, ET AL. The Royal Society for the Protection of Birds. Fifty-second Annual Report, for 1942: 1–48, 1943.

LUDWIG, C. C. Keeping bird banding records. Inland Bird Band. News (mimeogr.), **15** (3): 15, 17, June, 1943.

M., D. Eggs cracked by frost. Field, **181** (no. 4712): 400, Apr. 17, 1943.

MACALISTER, E. Experiences with London Birds (I). Country-side, (n. s.) **12** (6): 121–126, Mar., 1943.

MACCLOSKEY, J. E. Catbird and Carolina Wren. Cardinal, **6** (1): 20, Jan., 1943.

MARBLE, D. R. Genetics of egg shape. Poultry Sci., **22** (1): 61–71, figs. 1–4, Jan., 1943.

MARSHALL, EDRED J. L. Miscellaneous notes. Avic. Mag., (5) **7** (5): 145–146, Sept.–Oct., 1942.

MASON, EDWIN A. Eight-year old Barn Swallow. Bird-Band., **14** (1, 2): 45, Jan., Apr., 1943.

MASON, EDWIN A. Northern Shrike regurgitates pellet. Bird-Band., **14** (1, 2): 46, Jan., Apr., 1943.

MASON, EDWIN A. Six-year old Tree Swallow. Bird-Band., **14** (1, 2): 45, Jan., Apr., 1943.

MASON, EDWIN A. The romance of bird-banding. Bull. Mass. Aud. Soc., **25** (3): 241–242, Jan., 1943.

MASON, EDWIN A. Tree Swallow mates with son. Bird-Band., **14** (1, 2): 45, Jan., Apr., 1943.

MATHEWS, GREGORY M. Additions to the list of Australian birds and other notes. Austr. Zool., **10** (2): 161–166, Apr. 30, 1943.

MATTHEW, JOHN W. Moorhen "feigning" death. Brit. Birds, **36** (12): 246, May 1, 1943.

MAY, E. S. Food of the Great Spotted Woodpecker. Trans. Hert. Nat. Hist. Soc. and Field Club, **21** (6): 338–339, 1943.

MAYOR, A. Hermann Russ (3 juin 1875–3 février 1942). Nos Oiseaux, no. **160**: 117–120, 1 pl., Feb., 1942.—An obituary.

MAYOR, A. Législation. L'article 264 du nouveau code pénal suisse et les mauvais traitements infligés aux animaux. Nos Oiseaux, nos. **162–163**: 170–172, June–Aug., 1942.

MCCHESNEY, EVAN W. Comparison of hypercalcemic effects of activated sterols in the chick. Proc. Soc. Exper. Biol. and Med., **52** (2): 147–149, Feb., 1943.

MCCOLGAN, EDWARD. Some ancient observations of birds. Bull. Nat. Hist. Soc. Maryland (mimeogr.), **13** (1): 1–5, 2 pls., Sept.–Oct., 1942.

MCDONALD, NORMAN J. Fine feathers. Fauna, **5** (1): 7–13, 3 figs., Mar., 1943.—A popular discussion of feathers and their structure and color.

MCNALLY, EDMUND H. Some characteristics of the ovomucin gel of egg white. Poultry Sci., **22** (1): 25–29, figs. 1–2, Jan., 1943.

MCNALLY, EDMUND H. The origin and structure of the vitelline membrane of the domestic fowl's egg. Poultry Sci., **22** (1): 40–43, figs. 1–2, Jan., 1943.

MILLER, ANSEL B. Four-brooded Cardinals. Cardinal, **6** (1): 21–22, Jan., 1943.

MILLER, LOYE. The Pleistocene birds of San Josecito Cavern, Mexico. Univ. Calif. Publ. Zool., **47** (5): 143–168, Apr. 20, 1943.

MILLER, RICHARD F. The Pied-billed Grebe. A breeding bird of the Philadelphia region. Cassinia, **32**: 22–34, 1 pl., 1 fig., June, 1943.

MISCELLANEOUS. The 1942 Christmas bird count. Chat, **7** (1): 9–13, Jan., 1943.

MONCRIEFF, PERRINE. Occurrence of *Hirundapus caudacutus* in Nelson Province. Emu, **42** (4): 249, Apr., 1943.

MOREAU, R. E. Colletoptera affinis at the nest. Ostrich, **13** (3): 137–147, Sept., 1942.

MOREAU, R. E., AND PAKENHAM, R. H. W. The land vertebrates of Pemba, Zanzibar, and Mafia: a zoogeographical study. Proc. Zool. Soc. London, (A) **110**: 97–128, Mar., 1941.

MOREAU, R. E., and PAKENHAM, R. H. W. Corrigenda and addenda to "The Land Vertebrates of Pemba, Zanzibar, and Mafia: a Zoo-geographical Study." Proc. Zool. Soc. London, (A) **112**: 61–63, Sept., 1942.

MORLEY, AVERIL, AND DARLING. F. FRASER. Redwing singing full song in Britain. Brit. Birds, **37** (1): 17, June 1, 1943.

MORRISON, KEN. Bird houses go modern. Conserv. Volunt., **6** (31): 30–31, Apr., 1943.

MOWERY, WILLIAM BYRON. The Lord's tiny poultry. **Nature Mag., 36** (4): 209–212, 3 figs., Apr., 1943.—Popular notes on birds.

MUNRO, GEORGE C. The Indian Mynah (*Acridotheres tristis*) in Hawaii. Elepaio (mimeogr.), **3** (9): 29–31, Mar., 1943.

MUNRO, S. S., KOSIN, IGOR L., AND MACARTNEY, E. L. Quantitative genic-hormone interactions in the fowl. I. Relative sensitivity of five breeds to an anterior pituitary extract possessing both thryotropic and gonadotropic properties. Amer. Nat., **77** (770): 256–273, May–June, 1943.

MURRAY, P. D. F. The development of the conjunctival papillae and of the scleral bones in the embryo chick. Jour. Anat., **77** (3): 225–240, pls. 1–2, figs. 1–9, Apr., 1943.

NAETHER, CARL. Observations on softbills. Aviculture, **13** (2): 25–27, Mar.–Apr., 1943.

NALBANDOV, A., AND CARD, L. E. Effect of stale sperm on fertility and hatchability of chicken eggs. Poultry Sci., **22** (3): 218–226, fig. 1, May, 1943.

NEFF, JOHNSON A. Homing instinct in the Dwarf Cowbird in Arizona. **Bird.-Band, 14** (1, 2): 1–6, Jan., Apr., 1943.

NESTLER, RALPH B. Germinated seed versus ungerminated seed in the diet of adult Bobwhite Quail. Poultry Sci., **22** (3): 227–229, May, 1943.

NESTLER, RALPH B., AND BAILEY, WOODROW W. Vitamin A deficiency in Bobwhite Quail. Jour. Wildl. Management, **7** (2): 170–173, pl. 10, Apr., 1943.

NETHERSOLE-THOMPSON, CAROLINE AND DESMOND. Nest-site selection by birds. Field, **181** (no. 4717): 530–531, 6 figs., May 22, 1943.

NETHERSOLE-THOMPSON, C. AND D. Prolonged incubation by a Lapwing. **Brit. Birds, 36** (5): 98–99, Oct. 1, 1942.

NETHERSOLE-THOMPSON, C. AND D. Reactions of Lapwings towards damaged eggs. Brit. Birds, **36** (5): 99, Oct. 1, 1942.

NETHERSOLE-THOMPSON, CAROLINE AND DESMOND. The unwanted egg-shells. The Field, **181** (no. 4707): 268–270, 6 figs., Mar. 13, 1943.

NETHERSOLE-THOMPSON, D. Bigamy in Common Gull. **Brit. Birds, 36** (5): 99–100, Oct. 1, 1942.

NETHERSOLE-THOMPSON, D. Lesser Redpoll nesting in juniper. **Brit. Birds, 36** (5): 93, Oct. 1, 1942.

NETHERSOLE-THOMPSON, D. Passerines laying twice on same day. **Brit. Birds, 36** (5): 95, Oct. 1, 1942.

NEWMAN, ROBERT, AND KRAMER, QUENTIN. Bibliography of publications relating to the birds of Pennsylvania, New Jersey, and Delaware 1942. **Cassinia, 32**: 50–52, June, 1943.

NICHOLS, DAVID GELSTON. A brief visit to northern South America. **Gull, 25** (3): 11–12, Mar., 1943.

NICHOLS, J. T. On a case of reversed migration. **Bird-Band., 14** (1, 2): 46–47, Jan., Apr., 1943.

NICHOLS, ROBERT A. The breeding birds of St. Thomas and St. John, Virgin Islands. Mem. Soc. Cub. Hist. Nat. "Felipe Poey," **17** (1): 23–37, Apr., 1943.

NIVEN, P. N. F. Notes on birds from Coega River. **Ostrich, 13** (3): 165–167, 2 figs., Sept., 1942.

NOLL, HANS. La Sterne pierregarin (*Sterna hirundo* L.) à l'Untersee. **Nos Oiseaux, nos. 162–163**: 158–169, figs. 1–9, June–Aug., 1942.

NORDHOFF, CHARLES. Memories of birds. Aviculture, **12** (6): 325–327, Nov.–Dec., 1942.

N[ORTHWOOD], J. D'A. The White-eye. Elepaio (mimeogr.), **3** (4): 13–14, Oct., 1942.

NOWOTARSKI, J. S., AND BIRD, H. R. Dietary calcium and phosphorus levels and the vitamin D requirement of the chick. Poultry Sci., **22** (1): 72–78, Jan., 1943.

OAKES, CLIFFORD. Birds feeding on berries of service tree and guelder-rose. Brit. Birds, **36** (7): 140, Dec. 1, 1942.

OBERHOLSER, HARRY C. Sutton's Warbler. Cardinal, **6** (1): 20–21, Jan., 1943.—Suggests possibility that all three known individuals may have been members of a single hybrid brood.

ONSLOW, G. HUGHES. Scarce birds in Ayrshire. Brit. Birds, **36** (12): 241–242, May 1, 1943.

OWEN, O. R. Some breeding habits of the Pied Flycatcher. Brit. Birds, **36** (12): 245, May 1, 1943.

PAINTER, THEOPHILUS S., AND COLE, LEON J. The genetic sex of Pigeon-Ring-dove hybrids as determined by their sex chromosomes. Jour. Morphol., **72** (3): 411–439, pls. 1–4, May, 1943.

PALMER, E. LAURENCE. Some western birds. Nature Mag., **36** (4): 193–200, 18 figs., Apr., 1943.

PARKER, JESSE E., AND MCSPADDEN, B. J. Influence of feed restriction on fertility in male domestic fowls. Poultry Sci., **22** (2): 170–177, figs. 1–2, Mar., 1943.

PARKER, JESSE E., AND MCSPADDEN, B. J. Seasonal variation in semen production in domestic fowls. Poultry Sci., **22** (2): 142–147, fig. 1, Mar., 1943.

PAULY, TH., AND SCHÜZ. Vom Zug der Rothkehlchen (*Erithacus r. rubecula*) aus der Randgebieten der östlichen Ostsee. Vogelzug, **13** (1–2): 44–55, figs. 1–4, Jan.–Apr., 1942.

PAYNE, FERNANDUS. The cytology of the anterior pituitary of broody fowls. Anat. Rec., **86** (1): 1–13, pls. 1–2, May, 1943.

PEARSON, T. GILBERT. "The Day of the Birds" in Buenos Aires. Bull. Mass. Aud. Soc., **26** (8): 211–213, 1 fig., Dec., 1942.

PEARSON, T. GILBERT. What about hawks? Field and Stream, **48** (2): 20–21, 69, 6 figs., June, 1943 .

PENNIE, IAN D. Display of Black-throated Diver. Brit. Birds, **37** (1): 18, June 1, 1943.

PENNIE, IAN D. White-tailed Eagle in Kincardineshire. Brit. Birds, **36** (6): 113, Nov. 2, 1942.

PERRY, DAVID. Yellow Bunting, Sparrow-hawk, and Knots in Outer Hebrides. Brit. Birds, **36** (11): 226, Apr. 1, 1943.

PFEIFFER, CARROLL A., AND KIRSCHBAUM, ARTHUR. Relation of interstitial cell hyperplasia to secretion of male hormone in the sparrow. Anat. Rec., **85** (3): 211–227, pls. 1–2, Mar., 1943.

PHILLIPS, W. W. A. Ornithological observations [Ceylon]. Part IV. Loris, **3** (1): 23–27, 1 fig., Dec., 1942.

PHIPPS, NOËL. Bird watching in South Africa. Avic. Mag., (5) **7** (5): 138–142, Sept.–Oct., 1942.

PLOWES, D. C. H. Ovambo bird names. Ostrich, **13** (4): 233–235, Feb., 1943.

POLLARD, M., HALL, W. J., AND EICHHORN, A. Serological studies on the avian leukosis complex. Preliminary report on complement fixation. Poultry Sci., **22** (1): 20–24, Jan., 1943.

POOLE, EARL. Wharton Huber: 1877–1942. Cassinia, **32**: 42–43, 1 pl., June, 1943.—An obituary.

PORTER, SYDNEY. The Red-tailed Babbling-Thrush. Avic. Mag., (5) **7** (5): 142–144, Sept.–Oct., 1942.

POTTER, LAURENCE B. Saskatchewan bird records made since the publication of Mitchell's catalogue of Saskatchewan birds in 1924. **Blue Jay, 1** (3): 25, Apr.–May–June, 1943.

POUNDS, HUBERT E. Wheatear hovering. Brit. Birds, **36** (5): 94, Oct. 1, 1942.

QUIGLEY, GEORGE D. Is "bluecomb" of fowls produced by wheat. **Poultry Sci., 22** (3): 267–268, May, 1943.

RAINES, J. B. Remarkable behaviour of Coots. Brit. Birds, **36** (10): 201–202, Mar. 1, 1943.

RAND, A. L. On deciphering worn bands. Bird-Band., **14** (1, 2): 44, Jan., Apr., 1943.

RANDALL, WALTER C. Factors influencing the temperature regulation of birds. Amer. Jour. Physiol., **139** (1): 56–63, figs. 1–2, May 1, 1943.

RANEY, EDWARD C. Henslow's Sparrow in western Pennsylvania. **Cardinal, 6** (1): 22–23, Jan., 1943.

RAWLES, MARY E. The heart-forming areas of the chick blastoderm. Physiol. Zoöl., **16** (1): 22–43, pl. 1, figs. 1–6, Jan., 1943.

RENDEL, J. M. Variations in the weights of hatched and unhatched ducks' eggs. Biometrika, **33** (1): 48–58, Apr., 1943.

RENS, J. H. Circaetus swallows a snake. Ostrich, **13** (4): 240–241, Feb., 1943.

RIX, C. E. Additions to the birds of the Happy Valley district with a further record of Hylacola pyrrhopygia. So. Austr. Ornith., **16** (4): 40–41, Dec., 1942.

ROBERTSON, E. I., RHIAN, M., AND PALAFOX, A. L. The use of cockerel and pullet chicks in the determination of the gross value of protein supplements. Poultry Sci., **22** (2): 99–101, Mar., 1943.

ROLLIN, NOBLE. Sky-lark song. Brit. Birds, **36** (8): 146–150, figs. 1–5, Jan. 1, 1943.

ROLNIK, VERA. Instructions for the incubation of Eider Duck eggs. Jour. Wildl. Manag., **7** (2): 155–162, Apr., 1943.

ROMANOFF, ALEXIS L. Assimilation of avian yolk and albumen under normal and extreme incubating temperatures. Anat. Rec., **86** (2): 143–148, June, 1943.

ROMANOFF, ALEXIS L. A study of artificial incubation of Runner Duck eggs: requirements. Poultry Sci., **22** (2): 148–154, fig. 1, Mar., 1943.

ROMANOFF, ALEXIS L. Growth of avian ovum. Anat. Rec., **85** (3): 261–267, figs. 1–3, Mar., 1943.

ROMANOFF, ALEXIS L. Stimulating effects of ultraviolet radiation on biolectric potentials of an avian egg. Jour. Cell. and Compar. Physiol., **21** (2): 123–127, fig. 1, Apr., 1943.

ROOKE, K. B. Coloration of bill and legs of Redshank in down. Brit. Birds, **36** (5): 97–98, Oct. 1, 1942.

ROSS, C. CHANDLER (compiler). Field notes for the 1941–1942 season October 1, 1941 to September 30, 1942. Cassinia, **32**: 45–49, 1 fig., June, 1943.

ROSS, WINIFRED M. How a Tree-Creeper built its nest. Brit. Birds, **36** (6): 110–111, Nov. 2, 1942.

RUBIN, MAX, AND BIRD, H. R. Ascorbic acid storage in vitamin A deficient hens. Poultry Sci., **22** (1): 53–55, Jan., 1943.

RÜPPELL, WERNER. Versuch einer neuen Storchzugkarte. Vogelzug, **13** (1–2): 35–39, fig. 1, Jan.–Apr., 1942.

RUSSELL, JACK C., ET AL. Notes from correspondents. Florida Nat., **16** (3): 39–42, Apr., 1943.—Largely concerning birds.

RUSSELL, PAUL F., MOHAN, BADRI NATH, AND PUTNAM, PERSIS. Some observations on spleen volume in domestic fowls in the course of *Piasmodium gallinaceum* studies. Jour. Parasitol., **29** (3): 208–216, fig. 1, June, 1943.

RUTTLEDGE, ROBERT F. Ornithological notes from Galway and Mayo. Brit. Birds, **36** (12): 243–244, May 1, 1943.

RUTTLEDGE, ROBERT F. Scandinavian Lesser Black-backed Gull in Co. Mayo. Brit. Birds, **36** (7): 143, Dec. 1, 1942.

RYALL, R. H. Diving behaviour of a Pintail. Brit. Birds, **36** (10): 201, Mar. 1, 1943.

RYVES, B. H. An investigation into the roles of males in relation to incubation. Brit. Birds, **37** (1): 10–16, June 1, 1943.

SANDS, DOUGLAS B. Birding in the Air Corps. Bull. Mass. Aud. Soc., **26** (7): 191–193, Nov., 1942.

SAVAGE, L. F. Barn Owl in McKeesport. Cardinal, **6** (1): 19, Jan., 1943.

SCHANTZ, WM. E. Some returns and recoveries on grackles, starlings and robins. Inland Bird Band. News (mimeogr.), **15** (3): 19, June, 1943.

SCHLAG, CARL W. The hummingbirds in Ross Township. Cardinal, **6** (1): 19–20, Jan., 1943.

SCHMIDT, PH. Nesträuber. Schweiz. Naturschutz, **9** (1): 18–22, 3 pls., 1 fig., Feb., 1943.

SCHORGER, A. W. Extinct and endangered mammals and birds of the upper Great Lakes region. Trans. Wis. Acad. Sci., Arts and Lett., **34**: 23–44, 1942.

SCHRODER, HUGO H. Trumpeter of the prairies. Nature Mag., **36** (5): 240–242, 4 figs., May, 1943.—Popular account of Sandhill Cranes in Florida.

SCHRODER, HUGO H. Wings over Florida. Frontiers, **7** (4): 113, 4 figs., Apr., 1943.

SCHÜZ, E. Altersmerkmale und Zustand durchziehender Rauhfussbussarde, *Buteo l. lagopus* (Brünn.). Vogelzug, **13** (1–2): 2–17, figs. 1–18, Jan.–Apr., 1942.

SCHÜZ, E. Bilder zu: Spornammern (*Calcarius lapponicus*) als Durchzügler. Vogelzug, **13** (1–2): 1, fig., Jan.–Apr., 1942.

SCHÜZ, E. Flugweise des Singschwans (*C. cygnus*) beim Zug über Eisflächen. Vogelzug, **13** (1–2): 61–62, Jan.–Apr., 1942.

SCHÜZ, E. Kuckuck als Tagzügler. Vogelzug, **13** (1–2): 62–63, Jan.–Apr., 1942.

SCHWEPPENBURG, H. GEYR VON. Zur Terminologie des Kiebitzzuges. Vogelzug, **13** (1–2): 40–44, Jan.–Apr., 1942.

SCHWERDTFEGER, W. Eine seltene Vogepzugbeobachtung über der Nordsee. Vogelzug, **13** (1–2): 55–57, Jan.–Apr., 1942.

SCOTT, A. H. The life of Moses. Avic. Mag., (5) **8** (2): 33–39, Mar.–Apr., 1943.—Concerning a grebe.

SEAMANS, RAYMOND J. Birds of late summer. Bull. Mass. Aud. Soc., **26** (8): 207–209, Dec., 1942.

SEARCY, GLENN L., AND ANDREWS, FREDERICK N. The effect of comb and wattle removal upon testicular activity in the domestic fowl. Poultry Sci., **22** (3): 235–241, May, 1943.

SERVENTY, D. L. *Procellaria gavia*. Emu, **42** (4): 254, Apr., 1943.

SERVENTY, D. L. *Turdus volitans* and the Lambert drawings. Emu, **42** (4): 254–256, Apr., 1943.

SERVENTY, V. N. Notes on nesting birds of the Abrolhos Islands. Emu, **42** (4): 235–241, pls. 21–22, Apr., 1943.

SHAFFNER, CLYNE S., AND ANDREWS, FREDERICK N. The determination of the concentration of spermatozoa in fowl and bull semen. Anat. Rec., **86** (1): 99–107, figs. 1–2, May, 1943.

SHOEMAKER, HURST H. Color discrimination in canaries. Trans. Ill. State Acad. Sci., **35** (2): 217–219, fig. 1, Dec., 1942.

SHORTT, T. M., AND PETERS, H. S. Some recent bird records from Canada's eastern Arctic. Canad. Jour. Research, **20**: 338–348, fig. 1, Nov., 1942.

SIBLEY, C. L. Retaining color in the American Flamingo. **Aviculture, 13** (2): 34–35, Mar.–Apr., 1943.

SIMPSON, DORIS C. Late summer birds of the Blue Ridge Mountains. Jour. Tenn. Acad. Sci., **18** (2): 197–200, Apr., 1943.

SIMPSON, ROXIE COLLIE. Selection of a [North Carolina] state bird. **Chat, 7** (1): 5–6, Jan., 1943.

SKUTCH, ALEXANDER F. The family life of Central American woodpeckers. Sci. Monthly, **56** (4): 358–364, Apr., 1943.

SMITH, HARRY M. Size of breeding populations in relation to egg-laying and reproductive success in the Eastern Red-wing (*Agelaius p. phoeniceus*). **Ecol., 24** (2): 183–207, pl. 1, figs. 1–4, Apr., 1943.

SMITH, STUART G. Gulls plunging while bathing. **Brit. Birds, 36** (7): 142–143, Dec. 1, 1942.

SMITH, STUART. The instinctive nature of nest sanitation. **Part II. Brit. Birds, 36** (10): 186–188, pl. 5, Mar. 1, 1943.

SNYDER, L. L. From the diary of a Robin. Canad. Nature, **5** (3): 120–121, 7 figs., May–June, 1943.

SNYDOR, JAMES R. Robinson Crusoe on Pea Island. **Chat, 7** (1): 1–4, Jan., 1943.

SOMANDER, S. V. O. The White Ibis and its friends. **Loris, 3** (1): 28, 30, 1 fig., Dec., 1942.

STANWELL-FLETCHER, JOHN F. AND THEODORA C. Some accounts of the flora and fauna of the Driftwood Valley region of north central British Columbia. Occ. Pap. Brit. Col. Prov. Mus., no. **4**: 1–97, pls. 1–5, map 1, 1943.—Birds, pp. 43–78.

STATON, JACK. Kestrel following plough. Brit. Birds, **36** (12): 245, May 1, 1943.

STATON, JACK. Some birds at Nottingham Sewage Farm in 1942. **Brit. Birds, 36** (12): 242–243, May 1, 1943.

STUEWER, FREDERICK W. Small entrance to a Wood Duck nest. **Jour. Wildl. Manag., 7** (2): 236, Apr., 1943.

STEVENS, O. A. Audubon's farthest west. Frontiers, **7** (4): 125–128, Apr., 1943.

STILES, GEORGE W. Heat exhaustion in young turkeys. **Poultry Sci., 22** (3): 242–247, fig. 1, May, 1943.

STOTT, KEN, JR. Cranes in the field. Zoonooz, **16** (3): 4–5, 1 fig., Mar., 1943.

STOTT, KEN, JR. Tropical stragglers. Zoonooz, **15** (12): 6–7, Dec., 1942.

STRANG, P. D. Experiments in feeding foreign softbills. **Aviculture, 13** (2): 29–30, Mar.–Apr., 1943.

STRANG, P. D. The Blue Mexican Mockingbird (*Melanotis coerulescens*). **Aviculture, 12** (6): 335–336, Nov.–Dec., 1942.

STRESEMANN, E. Der Regenruf des Buchfinken und sein geographisches Variieren. Orn. Monatsber., **50** (2): 60–61, Mar.–Apr., 1942.—Geographical variation in the song of *Fringilla coelebs*.

STRESEMANN, ERWIN. Frühlingsanfang in Attika. Orn. Monatsber., **50** (2): 27–48, Mar.–Apr., 1942.—Notes on birds of Greece.

STRESEMANN, E. Zwergohreule (*Otus s. scops* (L.)) im Mittelmeergebiet. **Vogelzug, 13** (1–2): 62, Jan.–Apr., 1942.

STUBBERT, D. Display of Merlin. Brit. Birds, **37** (1): 17–18, **June 1, 1943.**

STURKIE, PAUL D. Five years of selection for viability in White Leghorn chickens. Poultry Sci., **22** (2): 155–160, Mar., 1943.

SUTTON, GEORGE MIKSCH. Bird hunting at Ciudad Victoria. Canal, **6** (1): 1–5, 1 pl., Jan., 1943.

SWEETLOVE, J. A. Pied Flycatchers breeding in Gloucestershire. Brit. Birds, **36** (10): 201, Mar. 1, 1943.

SZIDAT, LOTHAR. Ueber die Beziehungen zwischen Parasitologie und Ornithologie. Vogelzug, **13** (1–2): 17–35, Jan.–Apr., 1942.

TAYLOR, J. SNEYD. Notes on the martins, swallows and swifts: Graaff-Reinet. Ostrich., **13** (3): 148–156, 2 figs., Sept., 1942.

TEBBUTT, C. F. "Injury-feigning" of Wood-Pigeon. Brit. Birds, **36** (6): 115–116, Nov. 2, 1942.

TEMPERLEY, GEORGE W. Two-barred Crossbills in County Durham. Brit. Birds, **36** (11): 225, Apr. 1, 1943.

THIN, RUSSELL G. Dunlin brooding nestling Redshanks instead of its own eggs. Brit. Birds, **36** (6): 116–117, Nov. 2, 1942.

THOMAS, J. F. Report on the Redshank inquiry, 1939–40. Addenda and corrigenda. Brit. Birds, **36** (10): 202–203, Mar. 1, 1943.

THOMPSON, PAUL E. The relative incidence of blood parasites in some birds from Georgia. Jour. Parasitol., **29** (2): 153–155, Apr., 1943.

THOMSON, A. LANDSBOROUGH. Report of the Bird-ringing Committee. Brit. Birds, **36** (11): 209–213, Apr. 1, 1943.

THOMSON, DONALD F. Bush birds "Down Under." Nature Mag., **36** (4): 176–180, 8 figs., Apr., 1943.—Popular account of some Australian birds.

TRACY, J. C. The breeding birds of the Cresheim Valley in Philadelphia, 1942. Cassinia, **32**: 35–41, 1 fig., June, 1943.

TRAVASSOS, LAURO, AND TEXEIRA DE FREITAS, J. F. Relatório da sexta excursão do Instituto Oswaldo Cruz, realizada à zona da Estrada de Ferro Noroeste do Brasil, em Novembro de 1941. Mem. Inst. Oswaldo Cruz, **37** (3): 259–286, figs. 1–2, Sept., 1942.—The birds obtained by the expedition are treated on pages 271–280.

TRIMBLE, RUTH. Birds collected during two cruises of the "Vagabondia" to the west coast of South America. Ann. Carneg. Mus., **29**: 409–441, June 3, 1943.—Annotated list of the species of birds obtained, with critical notes on those of particular interest.

TUCKER, B. W. Aerial evolutions and soaring of Cormorants. Brit. Birds, **36** (6): 114–115, Nov. 2, 1942.

TURNER, RUTH D. Birding the first year of the war. A review of the Audubon check lists. Bull. Mass. Aud. Soc., **27** (2): 33–41, 2 figs., Mar., 1943.

TYLER, WINSOR M. City birds. Bull. Mass. Aud. Soc., **26** (7): 194–195, Nov., 1942.

UTLEY, J. P. A north Yorkshire Magpie roost. Brit. Birds, **36** (8): 159–160, Jan. 1, 1943.

VAN SOMEREN, V. G. L. On the exact type locality of *Cisticola chiniana ukamba*, Lynes. Bull. Brit. Orn. Cl., **63** (no. 446): 58, Mar. 10, 1943.

VENABLES, L. S. V., AND WYKES, U. M. An index to the Thames kingfisher recovery. Brit. Birds, **36** (8): 153–155, fig., Jan. 1, 1943.

VINCENT, JACK. On the occurrence of the Sprosser, Eastern or Thrush Nightingale, *Luscinia luscinia* (Linnaeus), in the Transvaal. Ostrich, **13** (4): 232–233, Feb., 1943.

VINCENT, JIM. Rare birds at Hickling, Norfolk. Brit. Birds, **36** (5): 96–97, Oct. 1, 1942.

VÖLKER, OTTO. Die gelben und roten Federfarbstoffe der Papageien. Zool. Centralbl., **62** (1, 2): 8–13, Jan.–Feb., 1942.

WAGSTAFF, HUGH G. Curlew breeding in Warwickshire. Brit. Birds, **36** (5): 98, Oct. 1, 1942.

WALKER, R. MILNES. Heron plunging into water from the air. Brit. Birds, **36** (12): 246, May 1, 1943.

WARREN, D. C., AND GISH, C. L. The value of artificial insemination in poultry breeding work. Poultry Sc[illegible] **2** (2): 108–117, Mar., 1943.

WATERS, NELSON F., AND B[illegible]ERS, JAMES H. A study of body weights in nine different strains of White [illegible]ghorns. Poultry Sci., **22** (2): 178–187, figs. 1–3, Mar., 1943.

WATSON, DENNIS W. Cultivation of the West Nile virus in the developing chick embryo. Proc. Soc. Exper. Biol. and Med., **52** (3): 204–205, Mar., 1943.

WATT, J. S. Some notes on the birds of the Kaokoveld. Ostrich, **13** (4): 185–202, 9 figs., Feb., 1943.

WEBSTER, J. DAN. Helminths from the Robin, with a description of a new nematode, *Porrocaecum brevispiculum*. Jour. Parasitol., **29** (3): 161–163, figs. 1–2, June, 1943.

WETMORE, ALEXANDER. Fossil birds from the Tertiary deposits of Florida. Proc. N. Engl. Zoöl. Club, **22**: 59–6[illegible], pls. [illegible]1–12, June 23, 1943.—Discussion of various forms. RHEGMINORNITHIDAE, new family; *Rhegminornis calobates*, new genus and species; *Gavia palaeodytes*, new species.

WETMORE, ALEXANDER, AND PHELPS, W. H. Description of a third form of curassow of the genus *Pauxi*. Jour. Wash. Acad. [illegible]ci., **33** (5): 142–146, figs. 1–2, May 15, 1943.—*Pauxi pauxi gilliardi*, new subspecies from near Tierra Nueva, Dept. Magdalena, Colombia.

WEYGANDT, CORNELIUS. Consider the swan. Cassinia, **32**: 1–21, June, 1943.

WHEELER, ROY. Fantailed Cuckoos. Emu, **42** (4): 251, Apr., 1943.

WHITSON, D., CARRICK, C. W., ROBERTS, R. E., AND HAUGE, S. M. Utilization of fat by chickens—a method for determining the absorption of nutriments. Poultry Sci., **22** (2): 137–14[illegible], Mar., 1943.

WHITTELL, H. M. The Noisy Scrub-bird (*Atrichornis clamosus*). Emu, **42** (4): 217–234, pl. 20, Apr., 1943.

WILLIAMS, C. S., AND KALMBACH, E. R. Migration and fate of transported juvenile waterfowl. Jour. Wildl. Manag., **7** (2): 163–169, Apr., 1943.

WILLIAMS, T. S. Bird life of the Formsby District (cont.). North West. Nat., **17** (3): 179–188, Sept., 1942.

WILSON, R. B. The Crowned Eagle in Natal. Ostrich, **13** (3): 168–169, Sept., 1942.

WILLIAMSON, KENNETH. Field notes on breeding pairs of Willow-Warbler and Chiff-chaff (cont.). North West. Nat., **17** (3): 173–178, Sept., 1942.

W[ITHERBY], H. F. Rear-Admiral Hubert Lynes, R. N., C. B., C. M. G. (1874–1942). Brit. Birds, **36** (8): 156–158, Jan. 1, 1943.—An obituary.

WITHERBY, H. F., AND FITTER, R. S. R. Black Redstarts in England in the summer of 1942. Brit. Birds, **36** (7): 132–139, Dec. 1, 1942.

WOLTERS, H. E. Ueber *Estrilda melpoda fucata* Neum. Orn. Monatsber., **50** (2): 57–58, Mar.–Apr., 1942.

WOOD, M. S. Bickerings above the bird table. The Field, **181** (no. 4708): 299, 7 figs., Mar. 20, 1943.—Photographs of pugnacious birds.

WOOD, RODNEY C. A cuckoo problem. Ostrich, **13** (3): 172–173, Sept., 1942.

WOOD, RODNEY C. Nesting habits of the Knob-billed Goose. (*Sarkidiornis melanonotus*.) Ostrich, **13** (3): 173–176, Sept., 1942.

WOOD, SHERWIN F., AND HERMAN, CARLTON M. The occurrence of blood parasites in birds from southwestern United States. Jour. Parasitol., **29** (3): 187–196, figs. 1–18, June, 1943.

NOTES AND NEWS

The Sixty-first Stated Meeting of the A. O. U.

In view of present conditions, as intimated in a note in 'The Auk' for July of this year, there will be no general meeting of the A. O. U. in 1943. A formal business meeting is, however, obligatory in order to transact the necessary business of the Society. Such business meeting will be held in New York City on October 20 and will convene in the Portrait Room, Theodore Roosevelt Memorial Wing, of the American Museum of Natural History, 79th Street and Central Park West.

In order to provide a quorum for each of the respective sessions, fifteen Fellows and Members, including ten Fellows and five members of the Council, must be present. There are sufficient numbers of each group living within a reasonable distance of New York to fill the quotas if all of them attend, but since some individuals no doubt will be unable to make the journey, it is hoped that others, somewhat more distant, will find it possible to reach the meeting. All who can do so are urged to be present.

The Royal Australasian Ornithologists' Union, through Mr. Jack Jones, Assistant General Secretary, has cordially invited all members of the A. O. U. who may find themselves in Australia to get in touch with the Society at 326 Flinders Lane, Melbourne, Victoria. If they are stationed elsewhere than in Victoria, a letter will bring the names of local members in their vicinity. It is hoped that anyone in correspondence with A. O. U. members known to be in Australia will pass this invitation along to them.

In recent months, the A. O. U. has suffered the loss of several prominent members. Notices of the following deaths have been received:

Fellow:

Dr. W. E. Saunders, London, Ontario.

Honorary Fellows:

Dr. A. H. Evans, England;
Dr. Einar Lönnberg, Sweden.

Members:

Bayard H. Christy, Sewickley, Pennsylvania;
Lieut. James Moffitt, San Francisco, California. (Died in the service of his country.)
Dr. T. Gilbert Pearson, New York, N. Y.

Associates:

Miss Harriet Abbott, Fryeburg, Maine;
William B. Mershon, Saginaw, Michigan.

The biography of Lieutenant Moffitt appears in this number of 'The Auk.' Biographies of the others will appear in forthcoming issues.

OBITUARIES

ELLIOTT BAIRD COUES, one of the youngest Associates ever elected in the American Ornithologists' Union, died January 2, 1913, at the age of 41. He was the son of Elliott and Jane Augusta McKenney Coues and was born January 19, 1872, at Fort McHenry, Baltimore, Maryland, while his father was surgeon at that post. He attended Columbian College (now George Washington University), in Washington, D. C., took special studies at the Lawrence Scientific School of Harvard and received the degree of M.D. from Bellevue Hospital Medical College, New York, in 1895. After graduation from college he practiced medicine in New York and in Haiti.

Coues was elected an Associate of the Union, at the early age of fourteen, at the first Washington meeting, in 1886, and continued his membership until 1895 when, apparently, professional demands required his full time and attention. While a student at Harvard he was elected a member of the Nuttall Ornithological Club, Dec. 8, 1890, but left Cambridge, two years later.

His single contribution to 'The Auk' consists of an article in the volume for 1888 on the 'Nesting of the Prairie Warbler (*Dendroica discolor*) in the Vicinity of Washington, D. C.' In this paper, unusually well-written for a boy of 16, he gave detailed descriptions of five nests which he had found on the Virginia side of the Potomac River in May, 1888, and showed that this warbler nested much more commonly near the Capitol than was generally supposed.—T. S. PALMER.

CHARLES KENNEDY KNICKERBOCKER, a Life Associate of the A. O. U. (elected 1922), died on January 7, 1940, of pneumonia after suffering from partial paralysis for several years. He was born in Chicago, September 28, 1874, the son of Henry M. and Rose Masters Knickerbocker. He never married and was survived by a sister, Mrs. Marion Wood, and two brothers, Harry R. and Guy R. Knickerbocker. He entered the employ of the Griffin Wheel Company in 1894 as a shipping clerk, was promoted to sales agent in 1895, general sales agent in 1909, and to first vice-president and director in 1914. He was a member of the Chicago Club, Chicago Athletic Association, Old Elm Club, Chicago Golf Club, and the Saddle and Cycle Club. Except for periods of travel, he was a lifelong resident of Chicago and was buried there.

His interest in ornithology was awakened through association, in visits to California, with O. W. Howard, G. Frean Morcom, and other members of the Cooper Club to which organization he belonged from 1905. In California, he began a collection of birds' eggs to which he added later especially by purchase. An important lot was that assembled by Gerard Alan Abbott, a well-known Chicago oologist. These accumulations were bequeathed to his nephew, Kenneth K. Knickerbocker, who donated them to Field Museum of Natural History.

Information incorporated in the preceding statement was obtained from Railway Age, 1940, p. 187, the Chicago Daily Tribune, January 8, 1940, and from Dr. W. H. Osgood of Field Museum and E. R. Ford of the Chicago Academy of Sciences.—W. L. MCATEE.

MARCUS WARD LYON, JR., an Associate elected in 1922, died at South Bend, Ind., May 19, 1942, at the age of 67. He was the eldest son of Captain Marcus Ward Lyon, U.S.A., and Lydia Anne Lyon and was born at Rock Island Arsenal, Feb. 5, 1875. His early life was spent at various army posts where he developed an in-

terest in natural history and began to collect insects and specimens of various kinds. He graduated from the Rock Island High School in 1893, from Brown University in 1897, and the following year served as instructor in bacteriology in North Carolina Medical College. In 1898 he set up his residence in Washington, D. C., where he was appointed Aid, and later Assistant Curator, in the Division of Mammals of the U. S. National Museum. He also took postgraduate work in George Washington University and received the degrees of M.S. in 1900, M.D. in 1902, and Ph.D. in 1913. At the same time he taught physiology and bacteriology in the Medical School of Howard University and later, 1915–1918, bacteriology, pathology, veterinary zoology and parasitology in the Medical School of George Washington University.

In 1902 he married Dr. Martha Maria Brewer of Lanham, Md., and in 1919 they joined the staff of the South Bend Clinic and maintained their association with it for many years. During the World War he served as pathologist in Walter Reed General Hospital in Washington, D. C., and was appointed a Major in the Medical Reserve Corps in September, 1919.

In 1899 Lyon accompanied Lieut. Wirt Robinson, U.S.A., to Venezuela on an expedition to collect mammals for the U. S. National Museum, and a report on the collection was published in the Proceedings of the Museum for 1901. In 1904 he represented the Museum at the Louisiana Purchase Exposition in St. Louis, in 1905 at the Lewis and Clark Exposition at Portland, Ore., and in 1911 he and his wife made a trip to Europe visiting museums and prominent zoologists.

Dr. Lyon was a member of a number of organizations and took an active part in the work of those to which he belonged. He was Corresponding Secretary of the Biological Society of Washington in 1904 and Recording Secretary 1915–1919, Treasurer, and later, President of the Indiana Academy of Science, and President of the American Society of Mammalogists from 1931 to 1933. He was primarily a mammalogist and pathologist and most of his papers, numbering about 160 in all, are devoted to mammals and pathology. A bibliography of his publications accompanying a biographical sketch of his activities, by Theodat Just, and a portrait may be found in 'The Midland Naturalist' for May 1942.

Dr. Lyon is survived by his daughter, Charlotte Lyon of Philadelphia, and two brothers, Henry S. Lyon of East Orange, N. J., and Col. James W. Lyon, U.S.A.—T. S. Palmer.

James Moffitt, well known and beloved by many ornithologists in this country and abroad, was killed in a plane crash at Dutch Harbor, Alaska, on July 2, 1943. At the time of his death he was a Lieutenant in the United States Naval Reserve and on active duty in the Aleutian Island area. He had been an Associate of the American Ornithologists' Union since 1926 and a Member since 1937.

Born in San Francisco on March 21, 1900, James Moffitt was the eldest son of Dr. and Mrs. Herbert C. Moffitt and a descendant of a distinguished family that was prominent in the early history of California. As a 'teen-aged' youth he showed a strong inclination toward the study of natural history and regularly visited the California Academy of Sciences which was then under the directorship of the late Dr. Barton W. Evermann. Dr. Evermann and, somewhat later, Dr. Joseph Grinnell did much to nurture his growing interest in ornithology during these formative years. In 1917 he entered the University of California but, with our country engaged in World War I, he enlisted in the United States Navy as

soon as he was eighteen years of age. Upon his return to civilian life, after the signing of the Armistice, he actively engaged in the field of bird study and shortly thereafter began making his own collection of bird skins.

The possibilities for regional faunal studies in California, such as were then being undertaken by Grinnell and Storer in the Yosemite region, greatly impressed him. Possessing a keen personal interest in the Lake Tahoe area of the central Sierra Nevada of California, it was not surprising therefore that he drew up a plan for a detailed report on the birds of this basin. This resulted in the intensive collecting of specimens and the assembling of all available published matter pertaining to the birds of this region during the ensuing years, whenever opportunity was afforded. Observations were made during all seasons of the year, including, on one occasion, an entire winter when field studies were carried on continuously from the autumn of 1926 to the spring of 1927. In the meantime he developed a special interest in game birds, particularly waterfowl, and in later years commenced working on a monograph on the geese of North America. His workmanship in the preparation of large bird skins was superb as is evidenced by his private collection of geese which is probably unexcelled in western United States, both as regards the quality of the material represented as well as its scientific value to those interested in this avian group.

After some years spent with the paper firm of Blake, Moffitt, and Towne, James Moffitt left the business world, which was not entirely to his liking, and in 1931 was appointed a member of the staff of the California Division of Fish and Game. Here in the Department of Education and Research he had opportunity to work on some of the waterfowl problems that had long interested him. One of his first acts in his new capacity was to organize an annual census of the number of Black Brant wintering in the bays along the California coast. This proved valuable in later years and was continued up to 1942 in coöperation with the Division of Fish and Game. The results formed, in part, a basis for the joint report by James Moffitt and Dr. Clarence Cottam on 'Eelgrass depletion on the Pacific coast and its effect upon Black Brant,' published in 1941 as Wildlife Leaflet 204 by the U. S. Fish and Wildlife Service.

In May, 1936, he was appointed Curator of the Department of Ornithology and Mammalogy at the California Academy of Sciences, a position left vacant by the death of Harry S. Swarth. Here he believed he would have at last the opportunity to complete his two major, pending research problems, the one on the birds of the Lake Tahoe region, the other a monograph on the geese of North America. Unfortunately, due to a number of circumstances, neither was finished.

The Academy bird collection at this time was arranged in accordance with Sharpe's 'Handlist' and was therefore considerably out of date systematically. With the opportunity present of obtaining Federal assistance, it was deemed advisable to rearrange the collection according to Wetmore's system of classification, following Peters's 'Birds of the World' as far as it went. This proved a large undertaking, especially with the assistance for the most part of unskilled personnel, as it necessitated the individual examination of nearly sixty thousand bird skins and the careful supervision of their arrangement. As would be expected, numerous problems in nomenclature, classification and indexing presented themselves. Much of the responsibility for the thoroughness and accuracy of this undertaking, which took nearly three years to complete, depended upon James Moffitt. During these years and succeeding ones he likewise made special effort to build up the osteo-

logical collection of birds and mammals, although personally but little interested in this subject. Meanwhile, numerous research problems of a less extensive nature than those primarily undertaken were completed.

With the outbreak of war between the United States and the Axis Nations, after the bombing of Pearl Harbor on December 7, 1941, James Moffitt immediately made effort to join the armed forces. While awaiting acceptance, he actively engaged in the San Francisco Civilian Defense Program. He possessed a keen sense of patriotism and love for his country and it was with deep satisfaction that he received his commission as Lieutenant in the U. S. Naval Reserve in March, 1942. After several months of training he was assigned to active duty in the treacherous, fog-bound Aleutian theatre of operations where he made the supreme sacrifice. He is survived by a widow, Mrs. Elizabeth Schmiedell Moffitt, and a daughter, Mrs. Richard Gatterdam.

James Moffitt was author of approximately eighty scientific papers, about three-fourths of which solely concerned birds. The remainder dealt primarily with mammalian problems. In addition to being a member of the American Ornithologists' Union he was affiliated with a large number of other scientific organizations among which may be mentioned the British Ornithologists' Union, the Cooper Ornithological Club, the Wilson Ornithological Club, the American Society of Mammalogists, the Wildlife Society, the National Audubon Society, the Audubon Association of the Pacific, and the Grinnell Naturalists Society. His passing is deeply felt by his many friends and associates in ornithology and the cause of conservation has lost one of its most ardent and active supporters.—Robert T. Orr.

Miss Mary O'Brien, an Associate of The American Ornithologists' Union since 1936, died while on a visit to her sister, in New York City, March 25, 1943, at the age of 53. She was a daughter of Edward and Ellen (Foley) O'Brien and was born at Glen of Aherlow, County Tipperary, Ireland, Dec. 16, 1889. She came to the United States above thirty years ago and spent nearly half of her life in Government service. She was educated in business and technical high schools and then took special courses at the Franklin Academy, the Research Union, the Spanish School in Washington and three semesters in the Graduate School of the U. S. Dept. of Agriculture. At the age of 22 she began work and spent six years, from 1912 to 1918, in several department stores, making and altering ladies' gowns. In the latter year she entered Government service as a clerk in the office of the Chief of Staff of the War Department and later was transferred to the office of the Quartermaster General of the Army. On March 16, 1922, she was transferred to the Biological Survey of the Department of Agriculture, where she was engaged in conservation work in connection with the importation of birds and mammals from foreign countries. Here she was entrusted with the work of preparing permits for the entry of foreign species and the accompanying correspondence, in checking reports of inspectors and in keeping the records of the entry of species from abroad. She was thoroughly familiar with the details of the laws and regulations governing such importations, handled much of the correspondence and prepared the statistics of importations for the annual reports issued by the Department.

Quiet, unassuming, but nevertheless ambitious, Miss O'Brien was a faithful and efficient worker, an accurate and rapid stenographer and typist and able to read and translate Spanish. In later years she occupied a unique position in conservation work and fully appreciated her responsibility in detecting and preventing the introduction of birds and mammals likely to prove injurious. She is survived by

two sisters, Mrs. Sarah Connally and Mrs. Nora Woods of New York, and a brother, Timothy F. O'Brien of Passaic, New Jersey.—T. S. PALMER.

ANTHONY WAYNE ROBINSON, an Associate of the American Ornithologists' Union, elected in 1903, died on November 29, 1939. He was born in Philadelphia, Pennsylvania, June 12, 1861, on Race Street, four doors west of the Academy of Natural Sciences. Here he spent much of his time in his early years. Following his scholastic work at the University of Pennsylvania, he entered the service of the Provident Life and Trust Company of Philadelphia in September, 1885, where he remained active until his physical condition became such that he resigned June 10, 1911. In the 'Proceedings of the Delaware Valley Ornithological Club' there is an entry showing his election to that club as an Associate Member on May 19, 1898. In November, 1899, the A. O. U. met in Philadelphia for the first time and Robinson was initiated into the atmosphere of that body, though his election as an Associate did not come until 1903.

His activities in the local D. V. O. C. were mainly in the field trips of the Club and its interesting meetings. He was always fond of walking and seldom missed the field trips, usually with one or more of his friends whom he would interest in the study of birds. On these trips and on his many longer ones he carried a camera and brought back to the Club in colored slides the artistic pictures of the scenes along the way. He kept a diary faithfully and was therefore in a position to give an interesting account of what was noted in bird life along his route of travel. He once described a trip he made across the continent, stopping at Yellowstone Park and landing in San Francisco. This was probably in 1915, when the A. O. U. met in that city. In 1920, at Washington, D. C., he started to attend these meetings regularly and missed few from that date until his death. His spirit of good fellowship and lovable disposition are very much missed by his many friends in the A. O. U. and the D. V. O. C.—HENRY T. UNDERDOWN.

GEORGE HERBERT ROSS, an Associate of the American Ornithologists' Union, elected in 1904, died May 31, 1942, after a long illness at the Peryer Convalescent Home in Rutland, Vermont, at the age of nearly seventy-four. He was the son of Zigon and Eleanor Brown Ross and was born in Rutland, June 24, 1868. While he was still a child the family moved to Washington, D. C., where he attended school and graduated from the High School in 1886. He recalled that he missed the graduating exercises at which President Grover Cleveland presided, because he was absent on a long 'hike.'

As a young man he spent two years in Cuba as a chemist in a sugar refinery and two years in the Surgeon General's office in Washington indexing the records of war veterans, but most of his life he worked as a mail clerk in the post office in Rutland until his retirement ten years before his death. He was also a volunteer coöperative weather observer for 25 years.

During his youth, in order to regain his health after a long illness, Ross spent a large part of several years camping and hunting and developed an interest in birds and plants which continued throughout his life. For many years he was president of the Vermont Bird Club and secretatry of the Vermont Botanical Club. He never married but lived with his cousin, Aimee F. Brown, who kept house for him in the old home at 23 West St. He is survived by his brother, William E. Ross of Rutland.—T. S. PALMER.

DR. ELLISON ADGER SMYTH, JR., an Associate of the American Ornithologists' Union since 1892 and an Honorary Life Associate since 1933, died at his home near Salem, Virginia, on August 19, 1941. The son of James Adger and Annie Briggs Smyth, he was born at Summerton, Clarendon County, South Carolina. He grew up in Charleston where he received his early education at Dr. Tarrant's classical school for boys. The influence of his scholarly grandfather, Dr. Thomas Smyth, for forty years minister of the Second Presbyterian Church of Charleston, awoke in him, when he was still a small boy, the interest in science that became a life-long devotion.

Young Smyth entered Princeton before his seventeenth birthday, graduating with the A.B. degree in 1884, and receiving his Master's degree there later. Obedient to his father's wishes, he studied law at Columbia University and at the University of Virginia, and became a junior partner with an uncle in the firm of Smyth and Lee in Charleston. But law could not long hold him away from nature. When the chair of biology at the University of South Carolina became vacant, he applied, and was elected adjunct professor. After two years, when the Virginia Agricultural and Mechanical College at Blacksburg, Virginia (re-named Virginia Polytechnic Institute in 1895) was reorganized in 1891, he was made the head of its Department of Biology.

Smyth was always a strenuous worker, interested in many activities outside the classroom. Living in barracks with the cadets, organizing and coaching the first football team for the college, developing a gymnasium and a 'gym' team, he attained a wide influence among the students. Throughout his years at Blacksburg he carried a heavy teaching load, with very little assistance, and from 1902 to 1906 served as Dean. This burden of teaching and administration not only hampered the research work which he wanted to do but also prevented the publication of much of the work which, in spite of these handicaps, he was able to accomplish.

In the early years at Blacksburg, most of his attention was given to insects. He built up a large collection of Lepidoptera, exchanging with collectors all over the world. The Sphingidae were his special interest; and in this field he became an authority. He was a founder of the Entomological Society of America, and for years a regular contributor to 'Entomological News.' In later years ornithology, which had attracted him from childhood, became his major scientific interest. An extensive collection of eggs which he built up was unfortunately destroyed by fire. He left a small but choice collection of some 1,500 skins. His ornithological publications were few but carefully prepared. The most important was a model annotated local list, 'Birds Observed in Montgomery County, Virginia,' published in 'The Auk,' October, 1912, and supplemented by a further article in January, 1927. He also wrote a history of V. P. I., a biography and estimate of the work of John Bennett for the 'Library of Southern Literature,' and popular science articles for 'St. Nicholas.'

For fifty years Dr. Smyth was an elder in the Presbyterian Church, teaching a men's Bible Class for an even longer period, and playing the organ in the church at Blacksburg for twenty-five years. He was made a Doctor of Laws by the University of Alabama in 1906. After his marriage in 1897 to Miss Grace Allan of Charleston, his life centered about his wife, his home, and his children.

Dr. Smyth was modest, shy, very retiring, but always friendly and democratic. He cared little for appearances and nothing for prominence, asking only to be

allowed to follow quietly the activities in which he was interested. In 1925 his health had become so impaired by his labors that he retired to Little Orchard, the farm which he had purchased near Salem. Here, still working hard, he spent sixteen pleasant years. His wife, a daughter, and three sons survive him, one daughter having died earlier. He is buried in Sherwood Cemetery, at Salem, Virginia. A more complete sketch of his life is to be found in the March–April, 1943, issue of 'The Raven.'—J. J. MURRAY.

GARDNER PERRY STICKNEY, an Associate of the American Ornithologists' Union from 1923 to 1935, was born at Groveland, Mass., November 9, 1862, and died at his home in Milwaukee, Wisconsin, February 25, 1935. His profession was that of investment counsellor and his side interests were education, regional history, and ornithology. He was a trustee of Milwaukee-Downer College and one of the founders of the Parkman Club. He brought to Wisconsin an interest in birds acquired in his native state, but did not become an Associate of the A. O. U. until 1923. Some of the notices that appeared at the time of his death state that his chief interest was in bird photography. This is entirely incorrect as he never even owned a camera. He belonged to that large group of bird students who seldom publish their studies. A note in 'The Auk,' 43: 380, 1926, on a check-list of Wisconsin birds appears to be his sole publication.—A. W. SCHORGER.

HARVEY ADAM SURFACE, an Associate of the American Ornithologists' Union from 1897 to 1917, died July 18, 1941, at the age of seventy-four, in the Geisinger Memorial Hospital, Danville, Pa., after an illness of about a year. He was the son of Daniel and Maria Josephine (Thomas) Surface and was born on a farm in Warren County near Waynesville, Ohio, July 25, 1867. His education was received at the Sugar Grove Seminary in Waynesville, the National Normal University at Lebanon, and the Ohio State University. He received the degrees of B.S. and M.S. from the University in 1891 and 1893, and D.Sc. from Franklin and Marshall College in 1907. He took postgraduate work at the University of Illinois in 1893–1894, and was associated with the Hopkins Seaside Laboratory of Stanford University from 1894 to 1895. During the succeeding years he taught various subjects of natural science in New York, Illinois, California, and Pennsylvania. At the University of the Pacific, San Jose, Calif., he served as professor of natural sciences from 1894 to 1896. At Cornell University he taught zoology from 1896 to 1898, and about the same time was director of nature study in the public schools of Ithaca, N. Y. From 1899 to 1900 he was field director of the Biological Station of the Illinois Natural History Survey, from 1900 to 1907 Professor of Zoology at Pennsylvania State College, from 1920 to 1930 Professor of Biology in Susquehanna University, and for a time Professor of Religious Interpretation in the Maine Theological School at Bangor.

In 1901, Dr. Surface entered the service of the State of Pennsylvania as Ornithologist, and in 1906 as Entomologist of the State Board of Agriculture. For fifteen years, beginning in 1903, he served as Economic Zoologist in the State Department of Agriculture and in 1930 was elected to the Legislature as a Representative from Snyder County.

Dr. Surface wrote extensively on the fauna, flora and horticulture of Pennsylvania. He was ornithological editor of 'American Gardening,' nature study editor of 'Popular Educator,' and editor of the monthly 'Zoological Bulletin' and the 'Zoological Quarterly.' In addition to holding membership in the A. O. U., he was a member of various organizations including the American Society of Natu-

ralists, the American Association for the Advancement of Science, Pennsylvania Audubon Society, and Pennsylvania Academy of Science, and for eighteen years was president of the Pennsylvania Beekeepers' Association.

He is survived by his wife, Ida May Bleasdale of Cleveland, Ohio, whom he married May 30, 1894, and by two daughters, Mrs. L. A. Clark of Columbus, Ohio, and Mrs. Robert E. Gray of Mechanicsburg, Pennsylvania.—J. S. WADE AND T. S. PALMER.

HERBERT LANDO THOWLESS, an Associate of the American Ornithologists' Union, elected in 1919, died at his home, 255 Fourth Street, Newark, N. J., May 13, 1940, in his 69th year. He was survived by a brother, Arthur J. Thowless, with whom he had made his home. He was born in Stratford, now Bridgeport, Conn., July 12, 1871, and removed with his parents to Newark in 1878. He was admitted to the New Jersey Bar in 1899 and served on the legal staff of the Mutual Benefit Life Insurance Company for twenty years, maintaining also a personal law office. He retired about 1935, due to ill health, at the same time giving up his independent practice. He was a member of the Newark Board of Education during 1905–1907.

Mr. Thowless was a member of the New Jersey Audubon Society from April, 1913, a sustaining member from April, 1928, and a trustee from 1915. He was also president of the Newark Bird Club for 20 years and furnished in great part the inspiration which maintained the organization in thriving activity. He was a member of twenty-two organizations. The faithfulness of Mr. Thowless to the organizations to which he lent his aid and the congenial character of his personality were outstanding and endeared him to those with whom he was associated. The Newark Bird Club did not long survive his loss and his death left a gap in the working ranks of the New Jersey Audubon Society which continues to be felt deeply.—B. S. BOWDISH.

WILLIAM HENRY TROTTER, an Associate of the American Ornithologists' Union for 34 years, died at Chestnut Hill, near Philadelphia, Pa., Nov. 7, 1933. He was born in Philadelphia, March 6, 1869, and throughout his life made Chestnut Hill his home. He was an intimate friend of mine from boyhood days and many of my early experiences in nesting were in company with him. He was a thorough and enthusiastic ornithologist and oologist and assembled quite a complete local collection of nests, eggs, and also of birds which he mounted in cases in lifelike habitat groups. Although a member of The Academy of Natural Sciences of Philadelphia and a favorite with a host of friends, Trotter was retiring by nature and rarely attended the meetings but would revel in an evening with intimate friends poring over their latest acquisitions or showing them his prizes.

He spent most of his summer holidays at Kennebunkport, Maine, where many species of birds were studied, but most of his collecting was done in the Wissahickon and White Marsh Valley area. Along the Wissahickon, within the boundaries of Philadelphia County, he made several notable nest-collecting records such as those of the Louisiana Water Thrush, Broad-winged Hawk and Turkey Buzzard.

Trotter was elected, in 1899, an Associate Member of both the A. O. U. and the D. V. O. C. He is survived by his widow and by his only daughter, Elizabeth Trotter, who has long served as secretary to Booth Tarkington, the well-known author.—GEORGE H. STUART 3D.

INDEX TO VOLUME 60

[New names are printed in bold-face type]

ABBOTT, Cyril E., Bone repair in ducks, 447
Abbott, Miss Harriet, notice of death, 632
Acanthidops bairdi, 281
Acanthis hornemanni exilipes, 283, 533
  h. hornemanni, 533
  linaria linaria, 283, 533
  l. rostrata, 283, 533
Accipiter cooperi, 390, 597
  gentilis atricapillus, 267
  g. gentilis, 267
  velox velox, 405
Actitis macularia, 390
Aechmolophus mexicanus, 253
Aepypodius, 264
Aëronautes, 264
Agelaius phoeniceus, 389, 594
  p. fortis, 591
  p. nevadensis, 102
  p. tricolor, 36
Ahern, G. S., White Gyrfalcon in Quebec, 598
Aimophila aestivalis bachmani, 605
  botterii, 242
  b. botterii, 243
  b. goldmani, 243
  b. nexicana, 244
  b. petenica, 242
  b. texana, 242
  ruficeps scotti, 350
Ajaia ajaja, 542
Aix sponsa, 446
Albatross, Black-footed, 537
Albino, 98
Alcippe morrisoniana, 257
  nipalensis, 257
Alectoris, 45
Alectura, 264
Alethe lowei, 256
Ali, Salim, 'The Book of Indian Birds,' (rev.), 287
Alle alle, 530, 598
Allen, Glover Morrill, in memoriam, 163
Allen, Robert Porter, 'The Roseate Spoonbill,' (rev.), 291
Amadon, Dean, Bird weights and egg weights, 221
Amaurospiza, 282
Amaurospizopsis relictus, 282
Amazonetta vittata, 250
A.O.U., membership list, xi; officers and committees, list, ix; Report of committee on Bird Protection, 152; Report of Treasurer, 147; Sixtieth Stated Meeting, 138
Ammodramus savannarum, 389, 444
Ammospiza caudacuta, 213
Amphispiza nevadensis nevadensis, 591
Anas, 264
  brasiliensis, 250
  diazi novimexicana, 314
  fulvigula maculosa, 543
  platyrhynchos platyrhynchos, 538
  rubripes tristis, 178
Anatomy, 235, 426
Anous stolidus, 574
  s. stolidus, 454
Anser, 264
  albifrons albifrons, 512
Anseriformes, 45, 264
Anthoscenus, 264
Anthus hoeschi, 255
  richardi, 256
  similis, 256
  spinoletta rubescens, 532, 591
  spraguei, 442
Anting, 51, 55, 59, 61
Antrostomus vociferus, 390
Apalis argentea, 258
Aplonis, 258
Aquila, 45
Archboldia papuensis, 259
Archilochus colubris, 390
Ardea herodias treganzai, 97, 102
Arenaria interpres morinella, 520
Argusianus 45, 264
Armstrong, Edward A., 'Bird Display,'

(rev.), 287; 'Birds of the Grey Wind,' (rev.), 456
Arquatella maritima, 521
Arremonops rufivirgatus rufivirgatus, 356
Artamus leucorhynchus melaleucus, 268
l. tenuis, 268
Artisornis winifredae, 256
Ashby, Edwin, obituary, 132
Asio flammeus flammeus, 599
wilsonianus, 599
Asmundson, V. S., Baker, G. A., and Emlen, J. T., Certain relations between the parts of birds' eggs, 34
Astrapia feminina, 259
mayeri, 259
splendidissima, 259
stephaniae, 259
Astur atricapillus atricapillus, 448
Asyndesmus lewis, 590
Atwood, Earl L., Recent interesting Louisiana records, 453
Auriparus flaviceps flaviceps, 328
Averrill, Charles Ketcham, obituary, 135
Avocet, 102

BAEOLOPHUS bicolor, 56, 106, 391
Bagg, Aaron Moore, Snow Buntings burrowing into snowdrifts, 445
Baird, Lucy Hunter, obituary, 483
Baker, E. C. Stuart, 'Cuckoo Problems,' (rev.), 113; [letter from], 476
Baker, G. A. See Asmundson, V. S., and —, 34
Baldpate, 27, 102, 156
Ball, Robert E., Migrant Gray-cheeked Thrushes in song, 595
Ball, Stanley C., Chimney Swifts at play?, 269
Bambusicola, 45
Barnes, Claude T., Spring migration on Farmington Bay, Utah, 103
Bartramia longicauda, 545
Bartsch, Paul, Birds and smell, 271
Basileuterus zimmeri, 254
Bates, George Latimer, obituary, 133
Batis kathleenae, 258
margaritae, 258
Beatty, Harry A., Records and notes from St. Croix, Virgin Islands, 110
Behavior, 91, 95, 97, 171, 181, 269, 270, 271, 319, 333, 367, 396, 444, 445, 446, 492, 574, 595
Behle, William H., Weights of some western subspecies of Horned Larks, 216
Behle, William H., and McKee, Edwin D., Additional bird records for Grand Canyon National Park, 278
Bellrose, Frank, Jr., Two Wood Ducks incubating in the same nesting box, 446
Bittern, American, 102, 172, 594
Least, 110
Bienteveo, 352
Blackbird, Brewer's, 36, 328, 355, 591
European, 54
Red-winged, 174, 389
Rusty, 540
Yellow-headed, 102, 355, 591
Bluebird, 54, 271, 389, 406
Azure, 348
Eastern, 91, 442, 548
Mountain, 590, 603
Bloomfield, Sarah Lucy (Collier), obituary, 484
Bobolink, 54
Bob-white, Northern, 225
Texas, 226
Bombycilla cedrorum, 54, 328, 391
Bonasa umbellus, 266, 388, 390, 594
Bond, James, Florida Burrowing Owl in Cuba, 105
Bond, Gorman. See Kolb, Haven, and —, 451
Botaurus lentiginosus, 102, 178, 594
Boulton, Rudyerd, Annual Report of the Treasurer, 147
Bourcieria, 264
Bowdish, B. S., obituary of Herbert Lando Thowless, 640
Brachypterus luteoventris idoneus, 258
Brachyramphus marmoratus, 540
Brambling, 54
Brand Bird Song Foundation, 'American Bird Songs,' (rev.), 288
Brant, American, 509
Black, 47
Branta bernicla nigricans, 47
b. hrota, 509
canadensis, 341
c. canadensis, 96, 512

Branta canadensis hutchinsi, 509
c. leucopareia, 512
Bray, Reynold, Notes on the birds of Southampton Island, Baffin Island, and Melville Peninsula, 504
Breckenridge, Bruce M. See Gilkey, Arthur K., and —, 272
Brimley, Clement Samuel. See Pearson, T. Gilbert, and —, 117
Brimley, Herbert Hutchinson. See Pearson, T. Gilbert, and —, 117
Brindley, Mrs. Harold Hulme, obituary, 133
Brodkorb, Pierce, Notes on two rare birds in Chiapas, Mexico, 280
Brooks, Allan, The status of the California Gull, 15
Broun, Maurice, Swimming ability of young Robin, 445
Broun, Maurice, and Goodwin, Ben V., Flight-speeds of Hawks and Crows, 487
Bubo maximus, 45
virginianus, 239
v. virginianus, 272
Bucco trimaculatus, 89
Bufflehead, 20, 278
Bullock, Dillman S., Duck Hawk at sea, 274
Bunting, Eastern Snow, 227, 534
Indigo, 52, 291, 407
Lark, 443
Lazuli, 328, 349, 443
Snow, 182, 445
Burns, Frank L., Eastern Evening Grosbeak at Berwyn, Pennsylvania, 600
Bush-tit, 328
Coast, 329
Buteo borealis, 282, 390
b. borealis, 544
b. calurus, 589
b. krideri, 283
lagopus s.johannis, 515
lineatus, 99, 390
l. alleni, 544
l. lineatus, 589
platypterus, 390
p. platypterus, 405, 599
swainsoni, 205, 589
Butorides virescens virescens, 404
Cahalane, Victor H. See Cottam, Clarence, and —, 152; Notes on Birds of the Kodiak-Afognak Island Group, 536
Calamospiza melanocorys, 443
Calcarius lapponicus lapponicus, 534
Calandria, 352
Calidris canutus rufus, 521
Callipepla, 45
squamata pallida, 226
Calypte, 264
costae, 329
Campbell, Louis W., Summer Tanager and White-eyed Vireo near Toledo, Ohio, 600
Campephilus principalis, 547
Campylopterus, 264
Canvas-back, 27, 156, 239, 278
Capella delicata, 102, 172
Caracara, Audubon's, 454
Cardellina rubrifrons, 348
Cardinal, 54, 100, 264, 391, 591
Eastern, 226
Carpodacus mexicanus frontalis, 328, 591
purpureus purpureus, 226
Cassidix mexicanus major, 549
m. mexicanus, 549
Catbird, 54, 56, 61, 99, 107, 226, 264, 406, 590, 596
Cathartes, 264
aura, 390
a. septentrionalis, 95
Catoptrophorus semipalmatus inornatus, 102, 590
s. semipalmatus, 110
Centrocercus, 45
urophasianus, 589
Centurus carolinus, 548, 599
Ceophloeus pileatus, 168, 390
Cepphus grylle, 604
g. mandti, 530
Certhia, 265
familiaris albescens, 347
f. americana, 547
Chachalaca, 264
Chaetura, 264
pelagica, 269, 390, 558
rubicola, 252
rutila brunnitorques, 252

Chamaea fasciata, 328
Charadrius hiaticula hiaticula, 518
melodus, 599
nivosus nivosus, 103
Charadrius semipalmatus, 518
Charitonetta albeola, 20, 278
Chat, Long-tailed, 443, 607
Yellow-breasted, 391
Chaulelasmus streperus, 102, 538
Chen caerulescens, 450, 510
hyperborea atlantica, 510
h. hyperborea, 102, 509
Chickadee, 499
Black-capped, 354, 405, 444, 595
Yukon, 540
Chicken, 36, 594
Prairie, 158
Attwater's Prairie, 544
Chloris chloris, 54
Chondestes grammacus strigatus, 328, 591
Chordeiles minor, 346
m. chapmani, 105
m. gundlachi, 105
m. hesperis, 590
m. howelli, 205
Christy, Bayard H. Obituary of Fred Leroy Homer, 485; notice of death, 632
Chrysolophus, 45
Chrysotrogon caligatus, 235
Ciconiiformes, 264
Cinclus mexicanus unicolor, 540
Cinnyris jugularis jugularis, 259
picta, 259
sperata juliae, 259
Circus hudsonius, 205
Cistothorus stellaris, 179, 599
Clangula hyemalis, 514
Clement, Roland C., American Three-toed Woodpecker in Massachusetts, 106
Clout, George John, obituary, 484
Cnipodectes, 45
Coccyzus, 265
americanus, 390
badius, 89
erythrophthalmus, 352, 390, 405
Coffey, Ben B., Notes of Mid-South towhees, 104
Colaptes auratus, 390
a. luteus, 56
cafer > auratus, 346
Colinus, 45
Colinus virginianus, 389
v. texanus, 226
v. virginianus, 225
Columba, 408
albilinea, 414
albitorques, 410
araucana, 414
arquatrix, 410
delegorguei, 410
fasciata, 409
goodsoni, 414
guinea, 410
leucocephala, 110
livia, 410
maculosa, 414
oenops, 414
oliviae, 410
picazuro, 414
plumbea, 414
pollenii, 411
rufina, 414
speciosa, 414
subvinacea, 414
Colymbus auritus, 537, 601
grisegena holboelli, 508, 537
nigricollis californicus, 102, 452
Compsothlypis americana, 254, 276, 391
Condor, California, 157
Conover, H. B. See Hellmayr, Charles, and —, 113
Conuropsis carolinensis ludovicianus, 546
Coot, 102, 594
Coragyps atratus, 390
a. atratus, 278
Cormorant, 594
White-crested, 537
Correspondence, 130, 306, 476
Corrigenda, 131, viii
Corthylio calendula calendula, 547
Corvus annectens, 89
brachyrhynchos, 391
b. brachyrhynchos, 226
b. caurinus, 540
b. hesperis, 205
corax, 391
c. principalis, 532

Corvus corax sinuatus, 273, 590
coronoides orru, 89
enca celebensis, 90
macrorhynchus, 89
Cossypha anomala lowei, 256
Cottam, Clarence, Bullock's Oriole as a fighter, 94; A correction, 286; Is the Starling population decreasing in northeastern United States?, 439; Unusual feeding habits of grackles and crows, 594
Cottam, Clarence, Finley, William L., Leopold, Aldo, and Cahalane, Victor H., Report of the Committee on Bird Protection, 1942, 152.
Coturnicops noveboracensis, 171
Coturniculus mexicanus, 243
Coturnix, 45
Coues, Elliott Baird, obituary, 633
Cowbird, 54, 372, 499, 596
Argentine Shiny, 350
Bronzed, 356
Dwarf, 329, 353
Eastern, 352
Nevada, 352
North American, 352
Screaming, 352
Shiny, 350
Small Shiny, 351
Western Shiny, 351
Cracidae, 264
Cranioleuca solimonensis, 252
vulpina alopecias, 252
Crane, 264
Little Brown, 159, 517
Sandhill, 96, 103, 159, 544
Whooping, 159, 547
Creeper, Brown, 265, 547
Mexican Brown, 347
Crocethia alba, 525
Crocias guttatus, 256
langbianis, 256
Crossbill, 502
Red, 276, 349
Crossoptilon, 45
Crouch, James E., Distribution and habitat relationships of the Phainopepla, 319
Crow, 391, 488, 594
Eastern, 226, 491
Crow, Northwestern, 540
Western, 205
Cuckoo, 476, 592
Black-billed, 390, 406
Yellow-billed, 265, 390
Cumley, Russell W., Geographic variation of the pigeons of the genus Columba, 408
Cummings, Emma Gertrude, obituary, 317
Curassow, 264
Curlew, Hudsonian, 521
Long-billed, 102
Curucujus massena, 235
Cyanocitta cristata, 170, 391
c. cristata, 226
Cyanops australis duvaucelii, 89
Cygnus, 264
buccinator, 542
columbianus, 509, 542, 601
Cypsilurus, 264
Cyrtonyx montezumae mearnsi, 226

DAFILA acuta tzitzihoa, 102, 178, 512
Dana, Edward Fox. See Pettingill, Olin Sewall, Jr., and —, 441
Danforth, Ralph E., Winter insect food of chickadees, 595
Deignan, H. G., Remarks on Phasianus Crawfurdii and other birds named by J. E. Gray from Crawfurd's 'Indian Drawings,' 88; A new grosbeak from northwestern Thailand, 608
Dendragapus, 45
Dendrocincla turdina taunayi, 252
taunayi, 252
Dendrocygna bicolor fulva, 100
Dendroica, 265, 406
aestiva, 389
a. aestiva, 367
auduboni, 451
a. auduboni, 348
caerulescens, 391
c. caerulescens, 108
cerulea, 275
chrysoparia, 110
discolor, 391, 605
dominica, 254
fusca, 391
graciae, 348

Dendroica magnolia, 108, 391
nigrescens, 329, 348
pensylvanica, 108, 391
pinus, 271
potomac, 254
striata, 99, 108
virens, 110, 391
Diardigallus diardi, 88
praelatus, 88
Dice, Lee R., 'The Biotic Provinces of North America,' (rev.), 609
Diomedea, 45
nigripes, 537
Dipper, 540
Distribution, 319
Divers, Black-throated, 508
Dixon, Joseph S., 'Wildlife Portfolio of the Western National Parks,' (rev.), 288
Domm, L. V. See Rollo, Marie, and —, 357
Dove, Mourning, 160, 390, 546
Western Mourning, 205
White-winged, 160, 449
Dovekie, 530, 598
Dowitcher, Long-billed, 103, 545
Dryobates borealis, 105
canicapillus, 564
c. aurantiiventris, 573
c. auritus, 572
c. canicapillus, 570
c. doerriesi, 566
c. delacouri, 571
c. kaleënsis, 567
c. mitchellii, 570
c. nagamichii, 566
c. obscurus, 568
c. omissus, 568
c. scintilliceps, 566
c. semicoronatus, 569
c. swinhoei, 567
c. tonkinensis, 569
c. volzi, 573
hardwickii delacouri, 571
leucotos kurodae, 566
moluccensis hardwickii, 564
m. moluccensis, 564
m. nanus, 564
obscurior, 573
pubescens, 168, 391
Dryobates pubescens medianus, 56
pygmaeus omissus, 568
p. permixtus, 568
semicoronatus szetechuanensis, 568
sp., 406
villosus, 390
Dryocopus javensis javensis, 88
Duck, 95
Black, 178, 438
Greater Scaup, 20, 102, 282, 538
Lesser Scaup, 21, 102, 156, 601
Mottled, 543
New Mexican, 314
Ring-neck, 25, 600
Ruddy, 27, 49, 102, 156, 344
Tufted, 20
Western Harlequin, 538
Wood, 156, 446
Dumetella, 264
carolinensis, 56, 99, 107, 226, 391, 406, 590
Du Mont, Philip A., Blue Geese on National Wildlife refuges of the Atlantic Coast, winter of 1941–'42, 109

Eagle, 45
American Golden, 491
Bald, 491
Northern Bald, 539
Ectopistes migratorius, 546
Edson, J. M., A study of the Violet-green Swallow, 396
Edwards, Ernest P., Hearing ranges of four species of birds, 239
Eggs, 34, 63, 221, 341
Egret, Brewster's, 102, 589
Egretta thula brewsteri, 102, 589
Eider, 20, 156
King, 513
Northern, 512
Steller's, 156
Elanoides forficatus forficatus, 543
Eliot, Samuel A., Jr., Goshawk nesting in Hampshire County, Massachusetts, in 1941 and 1942, 448; Tufted Titmouse in Massachusetts and Connecticut, 106; Whistling Swan at Brookfield, Massachusetts, 601; Scissor-tailed Flycatcher on Martha's Vineyard, 602

Elocincla aenigma, 256
Emlen, J. T. See Asmundson, V. S., and —, 34
Empidonax, 306
difficilis, 346
d. difficilis, 329
minimus, 391
Empidonax virescens, 391
traillii traillii, 405
Ensifera, 264
Ereunetes mauri, 102
pusillus, 525
Erickson, Arnold B., Sex ratios of ducks in Minnesota, 1938–1940, 20
Erismatura, 45
jamaicensis rubida, 30, 102
Ernst, Stanton Grant, Deformation in the wing of a Pied-billed Grebe, 447
Eudromia mira, 250
Eugenia, 264
Euphagus cyanocephalus, 36, 328, 353
c. cyanocephalus, 591
carolinus, 540
Eupoda montana, 205
Euscarthmornis aenigma, 253
Evans, A. H., notice of death, 632

Falco mexicanus, 170, 205
peregrinus anatum, 274, 515
rusticolus, 598
r. candicans, 515
sparverius phalaena, 589
Falcon, Prairie, 170, 205
Falconiformes, 264
Feathers, 44, 264, 265
Finch, Common House, 328
Eastern Purple, 226
House, 591
Purple, 54, 90
Weaver, 357
Yellow House, 352
Finley, William L. See Cottam, Clarence, and —, 152
Fish and Wildlife Service, 'Fading Trails' (rev.), 112
Fisher, A. H., obituary of Henry Corbin Fuller, 136
Fisher, James, 'The Birds of Britain,' (rev.), 456
Fisher, Walter T., Clark's Nutcracker in northwestern Michigan, 283
Flamingo, 264
Fleetwood, Raymond J., Scissor-tailed Flycatcher in St. Johns County, Florida, 448
Fleisher, Edward, Evening Grosbeak in summer in the Adirondack Mountains, 107
Flicker, 54, 90, 390
Red-shafted, 346
Flycatcher, Alder, 405
Arizona Crested, 346
Arizona Sulphur-bellied, 346
Coues's, 346
Crested, 391
Olive-sided, 347
Scissor-tailed, 448, 449, 602
Vermilion, 169, 353, 453
Western, 329, 346, 353
Food, 95, 273
Francolinus, 45
Fratercula corniculata, 540
Friedmann, Herbert, review by —, 113; Further additions to the list of birds known to be parasitized by the cowbirds, 350
Fringilla montifringilla, 54
Fulica americana, 102, 594
Fuller, Henry Corbin, obituary, 136
Fulmar, Atlantic, 508
Fulmarus glacialis glacialis, 508
Furnarius rufus rufus, 352

Gabrielson, Ira N., 'Wildlife Refuges,' (rev.), 456; Additional bird records from Alaska, 604
Gadwall, 27, 102, 538
Galliformes, 45
Gallinula, 264
Gallus, 45
domesticus, 36
Gavia arctica pacifica, 506, 537
adamsi, 505
immer, 601
i. immer, 505
stellata, 506
General Notes, 88, 264, 438, 589
Gennaeus, 45
leucomelanos moffitti, 255
lineatus sharpii, 89
moffitti, 255
nycthemerus, 36

Geococcyx californianus, 329, 590
Geokichla erythronota mendeni, 256
interpres interpres, 88
Geothlypis trichas, 95, 391
t. scirpicola, 329
Gilkey, Arthur K., Loomis, W. David, Breckenridge, Bruce M., and Richardson, C. Howard, The incubation period of the Great Horned Owl, 272
Glenny, Fred H., A systematic study of the main arteries in the region of the heart, Aves VI. Trogoniformes, Part 1, 235
Gnatcatcher, 328
Blue-gray, 548
Plumbeus, 329
Godfrey, W. Earl, Audubon's Warbler in Ohio, 451; Eared Grebe in Ohio, 452
Godwit, Hudsonian, 109
Marbled, 102
Pacific, 156
Golden-eye, American, 27
Goldfinch, 391, 502
Eastern, 226, 597, 607
Green-backed, 328
Lawrence's, 356
Goodwin, Ben V. See Broun, Maurice, and —, 487
Goosander, 20
Goose, Blue, 109, 156, 449, 447, 510
Canada, 96, 109, 341, 602
Hawaiian, 156
Hutchins's, 509
Lesser Snow, 102, 509
Snow, 109, 477
White-fronted, 512
Goshawk, 448
Eastern, 489
Grackle, Boat-tailed, 549
Great-tailed, 549
Purple, 56, 594
Grallaria auricularis, 253
macularia auricularis, 253
m. diversa, 253
nattereri, 253
Grebe, 48
Eared, 102, 452
Holboell's, 508, 537
Horned, 537, 601
Pied-billed, 102, 447
Greene, Earle R., Cuban Nighthawk breeding on Lower Florida Keys, 105
Greenfinch, 54
Greenway, James C., Jr., Oriental forms of the Pygmy Woodpecker, 564
Grinnell, Joseph. 'Joseph Grinnell's Philosophy of Nature,' (rev.), 458
Grosbeak, Black-headed, 54, 329
Blue, 443
Eastern Evening, 451, 600
Evening, 54, 107
Rose-breasted, 54, 99, 391
Groskin, Horace, Scarlet Tanagers 'anting,' 55
Gross, Alfred O., Another Blue Goose in Maine, 449
Grouse, 264
Franklin's, 265
Richardson's, 265
Ruffed, 158, 265, 266, 388, 390, 594
Sage, 589
Sharp-tailed, 158, 265
Gruiformes, 264
Grus, 45, 264
americana, 544
canadensis canadensis, 517
c. tabida, 96, 544
mexicana, 103
Guan, 264
Guillemot, Black, 604
Guillemot, Fossil, 604
Mandt's, 530
Guinea fowl, 264
Guiraca caerulea, 443
Gull, Black-headed, 574
Bonaparte's, 594
California, 15, 102, 590
Franklin's, 546
Glaucous, 527
Glaucous-winged, 539
Herring, 15, 528, 594
Ivory, 528
Laughing, 582, 594
Point Barrow Glaucous, 604
Ring-billed, 594
Sabine's, 279, 529
Slaty-backed, 604
Thayer's, 528
Vega, 604
Gymnogyps, 264

Gyrfalcon, 598
White, 515, 598

HALIAEETUS leucocephalus alascanus, 539
Halle, Louis, J., Jr., The Veery breeding in Washington, D. C., 103
Halloran, Arthur F., and Trowbridge, Albert H., A third record of the American Redstart for New Mexico, 607
Hamilton, W. J., Jr., Nesting of the Eastern Bluebird, 91; Spring food of the Robin in central New York, 273
Hammond, Edward K., Unusual breeding records from the Chicago region, 599
Handley, Charles O. See Mosby, Henry S., and —, 612
Haplospiza uniformis, 281
Harmston, F. D. See Knowlton, G. F., and —, 589
'Haviland, Maud'. See Brindley, Mrs. Harold Hulme, 133
Hawk, 264
American Rough-legged, 515
Broad-winged, 405, 490, 599
Cooper's, 390, 489, 597
Desert Sparrow, 589
Duck, 274, 491, 511, 515
Eastern Red-tailed, 489, 544
Eastern Sparrow, 491
Florida Red-shouldered, 544
Krider's, 282
Marsh, 205, 342, 491
Northern Red-shouldered, 490, 589
Pigeon, 491
Red-shouldered, 99, 390
Red-tailed, 282, 390
Sharp-shinned, 405, 488
Swainson's, 205, 589, 607
Western Red-tailed, 589
Hayward, C. Lynn, Notes on the status of the Red Crossbill in Utah, 276
Hearing ranges, 239
Hedymeles ludovicianus, 54, 99, 391
melanocephalus, 54
m. melanocephalus, 329
Hefner, R. A., and Mattox, N. T., Oregon Junco in Ohio, 449
Heleodytes brunneicapillus couesi, 328
chiapensis, 280
Heliothrix, 264
Hellmayr, Charles E., and Conover, Boardman, 'Catalogus of Birds of the Americas, Pt. 1, No. 1,' (rev.), 112
Helmitheros vermivorus, 391
Herbert, Richard, Peterson, Roger T., and Spofford, Walter R., Duck Hawk eyries in southern states, 274
Heron, 342
Black-crowned Night, 178
Great Blue, 97
Great White, 155
Green, 404
Treganza's, 97, 102
Hesperiphona vespertina vespertina, 451, 600
Hiatt, Robert W. See Wright, Philip L., and —, 265
Hicks, Lawrence C., The Sixtieth Stated Meeting of the American Ornithologists' Union, 138
Himantopus mexicanus, 95, 102
Hirundo erythrogaster, 36, 329, 389, 590
Histrionicus histrionicus pacificus, 538
Hoatzin, 264
Hollom, P. A. D., Bank Swallows nesting in artificial holes, 270
Homer, Fred Leroy, obituary, 485
Hope, C. E. See Shortt, T. M., and —, 449
Hotchkiss, Neil, Hooded Warbler in North Dakota, 607
Houppifer hoogerwerfi, 255
inornatus hoogerwerfi, 255
i. inornatus, 255
Howard, Julian A., Status of the White-winged Scoter in Louisiana, 453
Howell, A. Brazier, Starlings and Woodpeckers, 90
Huber, Wharton, obituary, 313
Hume, Edgar Erskine, 'Ornithologists of the U. S. Army Medical Corps,' (rev.), 289
Hummingbird, Broad-tailed, 346
Costa's, 329
Ruby-throated, 390
Hydroprogne caspia imperator, 102
Hylocichla faxoni, 352, 406
fuscescens, 103, 391, 596
guttata, 596

Hylocichla guttata auduboni, 348
g. polionota, 347
minima, 597
mustelina, 53, 99, 108, 391, 548, 591
ustulata, 596
u. swainsoni, 99, 172

Ibis, White-faced Glossy, 102, 589
Icteria virens, 391
v. longicauda, 442
Icterus bullocki, 95, 329, 443
b. bullocki, 591
cucullatus nelsoni, 328
galbula, 54, 443
spurius, 443, 600
Ictinia mississippiensis, 543
Iole olivacea crypta, 268
o. perplexa, 268
Iridoprocne bicolor, 270, 405
Ivor, H. R., Further studies of anting by birds, 51
Ixobrychus exilis exilis, 110
Ixoreus naevius naevius, 540
Iyngipus doerriesi, 566
scintilliceps swinhoei, 567
picatus, 573
pumilus, 570

Jaeger, Long-tailed, 527
Parasitic, 527
Pomarine, 526
Jaques, Florence Page, 'Birds across the sky,' (rev.), 113
Jay, Blue, 54, 170, 391
Northern Blue, 226
Jewett, Stanley G., A new horned lark from the state of Washington, 262
Jordan, Alvah Henry Bedell, obituary, 136
Junco hyemalis, 391, 407
h. hyemalis, 227, 534
oreganus, 449
o. montanus, 353
Junco, 54, 391, 592
Montana, 356
Oregon, 449
Slate-colored, 227, 407, 534

Keating, F. R., Violet-green Swallow in southeastern Minnesota, 455
Kent, Edward Gruet, obituary, 318
Killdeer, 102, 389, 590
Antillean, 110
Kingbird, 97, 265, 389, 605
Arkansas, 590, 602
Eastern, 590
Kingfisher, Belted, 390, 406
Western Belted, 540
Kinglet, 265
Golden-crowned, 547
Ruby-crowned, 547
Kite, Mississippi, 543
Swallow-tailed, 543
Kittiwake, Atlantic, 528
Pacific, 539
Kiwi, 221
Knot, American, 521
Knickerbocker, Charles Kennedy, obituary, 633
Knowlton, G. F., Raven eats Mormon cricket eggs, 273
Knowlton, G. F. and Harmston, F. C., Grasshoppers and crickets eaten by Utah birds, 589
Kolb, Haven, Status of *Dendroica cerulea* in eastern Maryland, 275
Kolb, Haven, and Bond, Gorman, Unusual records for eastern Maryland, 450
Kortright, Francis H., 'The Ducks, Geese and Swans of North America,' (rev.), 457

Lack, David, 'Life of the Robin,' (rev.), 609
Lagopus, 45
lagopus leucopterus, —
rupestris kelloggae, —
r. rupestris, —
Lanius ludovicianus ludovicianus, —
l. migrans, —
l. nevadensis, —
Lark, Desert Horned, 205, 590
Horned, 54, 184, 210, 216, 531
Prairie Horned, 105, 239
St. Helen's Horned, 262
Larus argentatus, 15
a. smithsonianus, 528
a. thayeri, 528
a. vegae, 604

Larus brachyrhynchus, 19
californicus, 15, 102, 590
canus, 16
delawarensis, 16
dominicanus, 16
fuscus, 16
glaucescens, 16, 539
heermanni, 16
hyperboreus, 16, 527
h. barrovianus, 604
occidentalis, 16
pipixcan, 546
ridibundus, 574
schistisagus, 604
Leipoa, 264
Leopold, Aldo. See Cottam, Clarence, and —, 152
Limnodromus griseus scolopaceus, 103, 545
Limosa fedoa, 102
haemastica, 108
Linduska, J. P., A gross study of the Bursa of Fabricius and cock spurs as age indicators in the Ring-necked Pheasant, 426; Cooper's Hawk carrying a nest of young goldfinches, 597
Liothrix lutea, 53
Lobipes lobatus, 526, 539
Lockley, R. M., 'Dream Island Days,' (rev.), 610
Lonchura castaneothorax, 260
montana, 260
monticola, 260
teerinki, 260
Longspur, Lapland, 534
McCown's, 181
Lönnberg, Dr. Einar, notice of death, 632
Loomis, W. David. See Gilkey, Arthur K., and —, 272
Loon, Common, 505, 601
Pacific, 162, 506, 537
Red-throated, 506
Yellow-billed, 505
Lophortyx californica, 36
c. brunnescens, 226
c. californica, 226
c. vallicola, 329
Lophura, 45
Loveland, Lillian S., Kingbird housekeeping, 97
Low, Jessop B., Wrens use duck down as nest lining, 593
Loxia curvirostris bendirei, 277
c. benti, 277, 350
c. grinnelli, 277, 350
c. stricklandi, 349
Lunda cirrhata, 540
Lynch, John J., Fulvous Tree-duck in Louisiana, 100
Lynes, Rear Admiral Hubert, notice of death, 311; obituary, 482
Lyon, Marcus Ward, obituary, 633

McAtee, W. L., obituary of Myron Harmon Swenk, 132; obituary of Charles Kennedy Knickerbocker, 633
McCabe, T. T., An Aspect of collectors' Technique, 550
McClure, Elliott, Albino Western Meadowlark, 98
McCormack, F. W., Nesting of the Prairie Horned Lark in northwestern Alabama, 105; Nesting of the Southern Robin in northwestern Alabama, 282
McIlhenny, E. A., Major changes in the bird life of southern Louisiana during sixty years, 541
McKay, A. K., Cowbird behavior, 596
McKee, Edwin W. See Behle, William H., and —, 278
McMillan, Neil T., 'Birds and Wind,' 307
Mackay, George Henry, obituary, 314
Magee, M. J., Seasonal changes in color of the gape of male Purple Finches, 90
Magpie, 442, 607
American, 540, 590
Main, John Smith, obituary, 318
Malacocincla "aenigma," 257
perspicillata, 256
rufiventris, 257
sepiaria tardinata, 257
vanderbilti, 257
Mallard, 156, 438, 446
Common, 538
Manning, T. H. See Bray, Reynold (with comments by —), 504
Mareca americana, 102
Marshall, Nelson, Factors in the incubation behavior of the Common Tern, 574

Martin, Purple, 347
Mathews, Gregory M., 'Birds and Books,' (rev.), 458
Mattox, N. T. See Hefner, R. A., and —, 449
Mayr, Ernst, Obituary of Fritz Sarasin, 137; A new swallow-shrike, 268; reviews by, 287, 292; 'Systematics and the Origin of Species,' (rev.), 289
Mayr, Ernst. See Zimmer, John T., and —, 249
Meade, Gordon E., Sage Thrasher in New York, 104
Meadowlark, 389
  Western, 98, 205, 328, 591
Meanley, Brooke, Red-cockaded Woodpecker breeding in Maryland, 105; Upland Plover in Adams County, Pennsylvania, 450; Nesting of the Upland Plover in Baltimore County, Maryland, 603
Meanley, Brooke. See Stewart, Robert E., and —, 605
Megaceryle alcyon, 390
  a. alcyon, 405
  a. caurina, 540
Megapodes, 264
Melanerpes erythrocephalus, 548
Melanitta deglandi, 282, 453, 538
  perspicillata, 282
Meleagris, 45
  gallopavo, 36, 390
Melopelia asiatica, 449
Melospiza fasciata montana, 246
  georgiana, 178, 227
  lincolni lincolni, 227
  melodia, 170, 210, 245, 391
  m. **bendirei**, 247
  m. fallax, 246
  m. insignis, 541
  m. melodia, 227, 407
  m. montana, 246
  m. saltonis, 248
  m. samuelis, 353
  m. virginis, 248
Membership List, xi
Mengel, Robert M. See Monroe, Burt L., and —, 282
Merganser, Red-breasted, 20, 514, 539
Mergus merganser, 20
  serrator, 20, 514, 539
Mershon, William B., notice of death, 632
Mickey, Frances Welton, Breeding habits of McCown's Longspur, 181
Micropallas whitneyi whitneyi, 345
Micropodidae, 264
Microscelis charlottae charlottae, 269
  c. crypta, 269
Mikheev, A. V., 'Contributions to the Biology of the Lapland Longspur,' (rev.), 611
Miles, M. L., Nevada Savannah Sparrow and Northern Pine Siskin in Louisiana and Mississippi, 606
Miller, Alden H., review by, 289
Miller, Loye, and DeMay, Ida, 'The Fossil Birds of California,' (rev.), 458
Mimus polyglottos, 36
  p. leucopterus, 328, 590
Miocepphus mcclungi, 604
Mixornis (?) winifredae, 256
Mniotilta varia, 108, 391, 442
Mockingbird, 36
  Western, 328, 590
Moffitt, James, obituary, 634; notice of death, 632
Molothrus ater, 352, 391
  a. artemisiae, 352
  a. ater, 352
  a. obscurus, 329, 353
  bonariensis, 350
  b. bonariensis, 350
  b. minimus, 351
  b. occidentalis, 351
  rufo-axillaris, 352
Monroe, Burt L., and Mengel, Robert M., Notes on some ducks collected in Kentucky, 282; Krider's hawk in Kentucky, 282
Montagna, William, Weights and plumages of the Horned Larks of central New York, 210
Moreau, R. E., A correction, 608
Mosby, Henry S., and Handley, Charles O., 'The Wild Turkey in Virginia,' (rev.), 612
Moseley, E. L., Gyrfalcon in Ohio, 598
Murray, J. J., obituary of Dr. Ellison Adgar Smyth, Jr., 638
Murre, Atlantic, 582
  Brünnich's, 530

Murre, California, 162, 539
Murrelet, Marbled, 540
Muscivora forficata, 448, 602
Mycerobas melanozanthos fratris-regis, 608
Myiarchus crinitus, 391
tyrannulus magister, 346
Myiochanes pertinax pallidiventris, 346
richardsoni richardsoni, 329, 590
virens, 391, 547
Myiodynastes luteiventris swarthi, 346

NANNUS hiemalis, 406
Nelson, Marcus C. See William, Cecil S., and —, 341
'Nene,' 156
Nettion carolinense, 538
crecca, 283
Nice, Margaret M., 'Starlings and Woodpeckers,' 310
Nichols, Charles K., 'Anting' by Robins, 59
Nichols, J. T , review by, 611
Nighthawk, 346
Cuban, 105
Florida, 105
Howell's, 205
Pacific, 590
Nomenclature, General Council on — [notice of], 479
Norris, Edward, obituary, 318
Norris, Robert, Churchill Savannah Sparrow at the Florida line, 103
Norton, Arthur H., European Teal in Maine, 283; Yellow-billed Tropic-bird in Maine, 284; obituary, 315
Notes and News, 137, 311, 479, 632
Nothura boraquira, 250
"darwini," 250
maculosa, 250
schreineri, 250
Nucifraga columbiana, 283
Numenius americanus, 102
Numididae, 264
Nutcracker, Clark's, 283
Nuthatch, Red-breasted, 265
White-breasted, 95, 391, 405
Nuttallornis borealis, 347
Nyctea, 45
nyctea, 48, 531
Nycticorax nycticorax hoactli, 178
Nyroca, 264
affinis, 26, 102, 601
americana, 102, 593
collaris, 600
ferina, 20
fuligula, 20
marila, 20, 102, 282, 538
valisneria, 239

OBITUARIES, 132, 312, 482, 633
O'Brien, Miss Mary, obituary, 636
Odontophorus, 45
Odontorchilus olallae, 253
Odum, Eugene P., 'Courtship feeding' in the Black-capped Chickadee, 444
Oenanthe oenanthe leucorhoa, 532
Officers and Committees, List of —, ix
Oidemia americana, 282, 538
Old Squaw, 514
Olin, Mrs. Walter C., Mountain Bluebird in Minnesota, 603
Opisthocomus, 45, 264
Oreopsar bolivianus, 255
Oreortyx, 45
picta, 226
Oreoscoptes montanus, 104, 352, 590
Oriole, Arizona Hooded, 328
Baltimore, 54, 94, 443
Bullock's, 94, 329, 443, 591
Orchard, 442, 600
Orr, Robert T., obituary of James Moffitt, 634
Osprey, 169, 438
Otocoris alpestris, 210, 216, 531
a. actia, 217
a. alpestris, 531
a. alpina, 262
a. ammophila, 219
a. articola, 216, 220, 262
a. enertera, 218
a. hoyti, 210, 531
a. insularis, 220
a. lamprochroma, 217
a. leucansiptila, 220
a. leucolaema, 205, 590
a. merrilli, 217, 263
a. praticola, 105, 210, 239
a. rubea, 217
a. sierrae, 220
a. strigata, 220

Otocoris alpestris utahensis, 220
Otus asio, 389
Oven-bird, 391, 442
Rufous, 352
Owl, 45
Barn, 599
Barred, 389
Burrowing, 590
Elf, 345
Florida Burrowing, 97, 105
Great Horned, 239, 272
Long-eared, 599
Screech, 91, 389
Short-eared, 599
Snowy, 531
Western Burrowing, 98
Oxyechus vociferus, 389
v. rubidus, 110
v. vociferus, 102, 590

PACKARD, Fred Mallery, Predation upon Wilson's Phalarope by Treganza's Heron, 97; Second record of the Wood Thrush in Colorado, with other observations, 107
Pagophila alba, 528
Palmer, Ralph S., obituary of Arthur Herbert Norton, 315
Palmer, T. S., obituary of Edwin Ashby, 132; George Latimer Bates, 133, Mrs. Harold Hulme Brindley, 133, Dr. Friedrich Steinbacher, 134; Emma Louisa Turner, 134; Alvah Henry Bedell Jordan, 136; William Plane Pycraft, 312; Montague Austin Phillips, 312; Baron René Charles Eduard Georges Jean Snouckaert van Schauburg, 313; George Henry Mackay, 314; Emma Gertrude Cummings, 317; Hubert Lynes, 482; Hugh McCormick Smith, 483; Lucy Hunter Baird, 483; Elliott Baird Coues, 633; Marcus Ward Lyon, 633; Miss Mary O'Brien, 636; George Herbert Ross, 637
Palmer, T. S. See Wade, J. S., and —, 639
Pandion haliaëtus, 169
Parasitism, 350
Paroquet, Louisiana, 546
Parrot, Yellow-headed, 271
Partridge, European, 226
Hungarian, 158
Passer domesticus, 62, 74, 389, 397
d. domesticus, 99
Passerculus sandwichensis nevadensis, 227, 606
s. oblitus, 103
s. savanna, 227
Passerella iliaca, 307
i. iliaca, 227, 307
i. mariposae, 227
i. schistacea, 307
i. unalaschensis, 307
Passerherbulus caudacutus, 600
Passerina amoena, 328, 349, 443
Passerina cyanea, 52, 391, 407
Pauxi pauxi unicornis, 251
unicornis, 251
Pavo, 264
Peacock, 264
Pearson, T. Gilbert, Brimley, Clement Samuel, and Brimley, Herbert Hutchinson, 'Birds of North Carolina,' (rev.), 117
Pedioecetes phasianellus campestris, 265
Pelecanus erythrorhynchos, 102
Pelican, White, 102
Pelidna alpina sakhalina, 524
Penthestes, 391
atricapillus, 444
a. atricapillus, 352, 405, 595
a. turneri, 540
Perdicidae, 264
Perdix, 45
perdix, 226
Peterson, Roger T. See Herbert, Richard, and —, 274
Petrides, George A., Berberis bealei as a spring food of songbirds, 99; Variation in the outermost greater primary covert as related to method of flight, 264
Petrochelidon albifrons, 36, 347, 389, 441
a. albifrons, 328
Petroica archboldi, 258
rhodinogaster, 258
rosea, 258
Pettingill, Olin Sewall, Jr., and Dana, Edward Fox, Notes on the birds of western North and South Dakota, 441

Peucaea aestivalis var. arizonae, 243
Pewee, Eastern Wood, 547
Western Wood, 329, 590
Wood, 391
Phaenicophaus Crawfurdii, 89
Phaeopus hudsonicus, 521
Phaëthon lepturus catesbyi, 284
Phainopepla, 169, 319, 333
nitens, 169, 333
n. lepida, 319
Phalacrocorax auritus cincinatus, 537
Phalarope, 156
Northern, 526, 539
Red, 539
Wilson's, 97, 102, 353, 599
Phalaropus fulicarius, 526, 539
Phasianidae, 264
Phasianinae, 45
Phasianus, 45, 264, 594
colchicus torquatus, 36, 266, 426
Crawfurdii, 88
Phasidus, 264
Pheasant, 264, 265, 594
Ring-necked, 36, 158, 266, 426, 589, 597
Silver, 36
Philemon brassi, 260
Phillips, Allan R., Critical notes on two southwestern Sparrows, 242
Phillips, Montagu Austin, obituary, 312
Philohela minor, 390, 405
Phoebe, 391, 405
Black, 329
Say's, 590
Phoenicopterus, 264
Photoperiodicity, 357
Phylloscartes chapmani, 253
Pica pica, 442
p. hudsonia, 540, 590
Picidae, 265
Picoides tridactylus bacatus, 106
Picus aurantiiventris, 573
canicapillus, 570
Crawfurdii, 88
kaleënsis, 567
mitchellii, 570
moluccensis, 565
pygmaeus, 570
scintilliceps, 566
semicoronatus, 569
Pigeon, Band-tailed, 160
Passenger, 546
White-crowned, 110
Pintail, 27, 102, 156, 178
American, 512
Pipilo erythrophthalmus, 61, 391
e. erythrophthalmus, 227
fuscus crissalis, 328
maculatus arcticus, 443
m. falcifer, 227, 353
m. megalonyx, 329
m. montanus, 350
Pipit, American, 532, 591
Sprague's, 442
Piranga erythromelas, 57, 391, 407
ludoviciana, 329, 349
rubra rubra, 600
Pisobia bairdi, 523
fuscicollis, 522
melanotos, 522, 545
minutilla, 524
Pitangus sulphuratus bolivianus, 352
Pithys albifrons brevibarba, 253
castanea, 263
"Plagiospiza" superciliosa, 245
Plectrophenax nivalis, 239
n. nivalis, 227, 445, 534
Plegadis guarauna, 102, 589
Plover, American Golden, 519
Black-bellied, 102, 519
European Ringed, 518
Mountain, 205
Pacific Golden, 156
Piping, 599
Semipalmated, 518
Snowy, 103
Upland, 450, 545, 603
Plumages, 210, 266
Pluvialis dominica dominica, 519
Pochard, Common, 20
Podilymbus podiceps podiceps, 102, 447
Polioptila caerulea caerulea, 548
melanura melanura, 329
species, 328
Polyborus cheriway auduboni, 454
Polyplectron, 45
Pooecetes, 265
gramineus, 271, 389, 605
g. confinis, 205, 591
g. gramineus, 227

Porphyrio, 264
Pratt, Davis W., Red-shouldered Hawk caught in mink trap, 99
Priotelus temnurus, 235
Progne subis hesperia, 347
s. subis, 347
Psaltriparus minimus, 328
m. minimus, 329
Ptarmigan, Kellogg's, 516
Rock, 516
White-shafted, 516
Ptarmigan, Willow, 516
Pternistes, 45
Pteroglossus bitorquatus sturmii, 251
flavirostris mariae, 251
olallae, 251
Pucrasia, 45
Puffin, Horned, 540
Tufted, 540
Pycraft, William Plane, obituary, 312
Pyrocephalus rubinus, 169
r. mexicanus, 453
Pyromelana franciscana, 357
Pyrotrogon erythrocephalus, 235
Pyrrhura chapmani, 251
melanura chapmani, 251

QUAIL, 36, 264, 389
Arizona Scaled, 226
California, 226
Coast California, 226
Mearns's, 226
Mountain, 226
Valley, 329
Querquedula cyanoptera, 102
discors, 102, 178, 345
d. "albinucha," 454
Quiscalus quiscula quiscula, 56, 594

RAIL, 264
Virginia, 172, 594
Yellow, 171
Rallidae, 264
Rallus, 264
limicola, 594
Rand, A. L., Bass eats Yellowthroat, young Stilts and young Ducks, 95; Some irrelevant behavior in birds, 168
Rand, A. L. and R. M., Breeding notes on the Phainopepla, 333
Rapp, William F., Jr., Turkey Vulture feeding habits, 95; obituary of Edward Gruet Kent, 318; obituary of William James Rusling, 486
Raven, 273, 391
American, 590
Northern, 532
Recent Literature, 112, 287, 456, 609
Recurvirostra americana, 102
Redhead, 27, 102, 156, 593
Redpoll, Common, 533
Greater, 283, 533
Hoary, 283, 533
Hornemann's, 533
Redstart, 99, 391
American, 607
Painted, 349
Red-wing, 594
Bicolored, 355
Gulf Coast, 355
Nevada, 102
Thick-billed, 591
Tricolored, 36
Regulus satrapa satrapa, 547
Rehn, James A. G., obituary of Wharton Huber, 313
Reports: Secretary, 138; Treasurer, 147; Committee on Bird Protection, 152
Rhinopsar brunneicapillus, 258
Rhinortha chlorophaea, 89
c. chlorophaea, 604
c. fuscigularis, 604
Rhopodytes sumatranus, 89
Rhynchophanes mccowni, 181
Rhynchothraupis mesoleuca, 254
Richardson, C. Howard. (See Gilkey, Arthur K., and —, 272
Richardson, Frank, Functional aspects of the inner vane of remiges, 44
Richmondena, 264
cardinalis, 100, 391
c. cardinalis, 226
Riparia riparia, 347
r. riparia, 270
Ripley, S. Dillon, An old record for Celebes revived, 89; The name of the Sumatran Crested Olive Bulbul, 268; 'Trail of the Money Bird,' (rev.), 459; Rhinortha chlorophaea in Borneo, 604
Riley, Joseph Harvey, obituary, 1

Rissa tridactyla pollicaris, 539
t. tridactyla, 528
Road-runner, 329, 590
Robin, 596
(American), 54, 391, 445
Eastern, 56, 59, 61, 99, 273, 282
Pekin, 53
Southern, 282, 548
Western, 354, 590
Robinson, Anthony Wayne, obituary, 637
Rollo, Marie, and Domm, L. V., Light requirements of the Weaver Finch, I. Light period and intensity, 357
Rollulus, 45
Ross, George Herbert, obituary, 637
Ross, Lucretius H., Catbird wintering in Bennington, Vermont, 107
Rusling, William James, obituary, 486

SALPINCTES obsoletus obsoletus, 590
Sanderling, 525
Sandpiper, Baird's, 523
Buff-breasted, 546
Least, 524
Pectoral, 156, 522, 545
Purple, 521
Red-backed, 156, 524
Semipalmated, 525
Spotted, 390
Western, 102
White-rumped, 522
Sapsucker, Yellow-bellied, 390
Sarasin, Fritz, obituary, 137
Saunders, Aretas A., obituary of Charles Ketcham Averill, 135
Saunders, Dr. William E., notice of death, 632
Saucerottia florenceae, 252
Sayornis nigricans nigricans, 329
phoebe, 391, 405
saya, 590
Scepomycter, 256
Schorger, A. W., obituary of John Smith Main, 318; Gardner Perry Stickney, 639
Schrantz, F. G., Nest life of the Eastern Yellow Warbler, 367
Scoter, American, 282, 538
Surf, 282
Scoter, Velvet, 20
White-winged, 282, 453, 538
Seiurus aurocapillus, 391, 442
motacilla, 391
noveboracensis, 178, 279
n. limnaeus, 279
n. noveboracensis, 406
Selasphorus, 264
platycercus, 346
Setophaga picta picta, 349
ruticilla, 99, 391, 607
Sex ratios, 20
Sharp, Barton L., Scissor-tailed Flycatcher in Pennsylvania, 449
Sheppard, R. W., obituary of George John Clout, 484
Sheppardia bensoni, 256
gunningi bensoni, 256
Shortt, T. M., and Hope, C. E., White-winged Dove in Ontario, 449
Shoveller, 25, 102, 156
Shrike, Loggerhead, 549
Migrant, 591
Nevada, 591
Sialia currucoides, 590, 603
sialis, 91, 271, 389
s. fulva, 348
s. sialis, 406, 442, 548
Sicalis pelzelni, 352
Simpson, Roxie Collie, Wood Thrush in North Carolina in winter, 599
Siskin, Northern Pine, 356, 443, 607
Pine, 349
Sitta, 265
carolinensis, 391, 405
c. carolinensis, 96
Smell, Birds and —, 271
Smith, Hugh McCormick, obituary, 483
Smith, Wendell P., Hoary and Greater Redpolls in Vermont, 283
Smyth, Dr. Ellison Adgar, Jr., obituary, 638
Snipe, Wilson's, 102, 159, 172
Somateria mollissima, 20
m. borealis, 512
spectabilis, 513
s. "sedentaria," 513
Sooter, Clarence A., Canada Geese perching at Malheur Refuge, 96

Soper, J. Dewey, A method of remaking old bird skins, 284
Sora, 172
Sparrow, 265
Bachman's, 356, 605
Bischoff's Song, 541
Botteri's, 242
Brewer's, 444
Canyon Song, 246
Chipping, 94, 271, 391, 605
Eastern Chipping, 227
Eastern Field, 227
Eastern Fox, 227
Eastern Lincoln's, 227
Eastern Savannah, 227
Eastern Song, 227
Eastern Vesper, 227
English, 62, 74, 389, 397
Field, 391, 605
Fox, 54, 307
Gambel's, 328, 591
Grasshopper, 389, 444
Harris's, 54
House, 99
LeConte's, 600
Mariposa Fox, 227
Mountain Song, 246
Nevada Savannah, 227, 606
Sage, 591
Samuels's Song, 356
Scott's, 350
Sharp-tailed, 213
Song, 54, 170, 185, 210, 245, 306, 391, 407
Swamp, 178, 227
Texas, 356
Tree, 227
Tucson Song, 247
Vesper, 271, 389, 605
Western Chipping, 329, 591
Western Lark, 328, 591
Western Vesper, 205, 591
White-crowned, 54, 534, 591
White-throated, 54, 227, 407, 592
Spatula clypeata, 102
Speed, 487
Speotyto cunicularia floridana, 97, 105
c. hypugaea, 98, 590
Sphyrapicus varius, 390
Spinus lawrencei, 353
Spinus pinus macropterus, 349
p. pinus, 349, 356, 443, 607
psaltria hesperophilus, 328
tristis, 391
t. tristis, 226, 597
Spizella, 265
arborea, 227
breweri breweri, 444
passerina, 271, 391, 605
p. arizonae, 329, 591
p. passerina, 227
pusilla, 391, 605
p. pusilla, 227
Spodiornis barrilesensis, 281
rusticus, 281
uniformis, 281
Spofford, Walter R., See Herbert, Richard, and —, 274
Spoonbill, Roseate, 155, 542
Sprunt, Alexander, Jr., A generally unrecognized habit of the Florida Burrowing Owl, 97; The Dovekie in South Carolina, 598
Squatarola squatatrola, 102, 519
Stachyris davidi bangsi, 257
d. bhamoensis, 257
d. davidi, 257
d. goodsoni, 257
d. praecognita, 257
rodolphei, 257
ruficeps rodolphei, 257
Starling, 55, 74, 90, 99, 310, 389, 439, 549
Steganopus tricolor, 97, 102, 599
Steganura paradisea, 357
Steinbacher, Dr. Friedrich, obituary, 134
Stejneger, Leonhard, obituary, 311
Stelgidopteryx ruficollis, 102, 389
Stercorarius longicaudus, 527
parasiticus, 527
pomarinus, 526
Sterna forsteri, 102
fuscata, 574
hirundo hirundo, 102, 574
paradisaea, 529
Stewart, Robert E., Post-breeding pugnacity of the Pine Warbler, 271; A comparative study of the breeding bird population of the Shenandoah Mountains, Virginia, 388
Stewart, Robert E., and Meanley,

Brooke, Bachman's Sparrow in Maryland, 605
Stickney, Gardner Perry, obituary, 639
Stilt, 95
Black-necked, 102
Stimson, Louis A., Black-throated Gray Warbler at Miami, Florida, 452
Stoner, Dayton, Defensive behavior of the White-breasted Nuthatch, 95
Storer, Tracy I., 'General Zoology,' (rev.), 459
Strix varia, 389
Strong, R. M., Dr. Strong's 'Bibliography of Birds,' 311
Stuart, George H., 3rd, obituary of Edward Norris, 318
Stuart, George H., Jr., obituary of William Henry Trotter, 640
Sturnella magna, 389
m. neglecta, 98
neglecta, 205, 328, 591
Sturnus vulgaris, 74, 99, 310, 389
v. vulgaris, 549
Surface, Harvey Adams, obituary, 639
Sutton, George Miksch, Hudsonian Godwit in Wayne County, New York, 109; Records from the Tucson region of Arizona, 345
Swallow, Bank, 102, 270, 347
Barn, 36, 329, 389, 590
Cliff, 36, 347, 389, 441
Northern Cliff, 328
Northern Violet-green, 347
Rough-winged, 102, 389
Tree, 270, 405
Violet-green, 102, 396, 455
Swan, Mute, 601
Trumpeter, 157, 542
Whistling, 509, 542, 601
Swenk, Myron Harmon, obituary, 132
Swift, 264
Chimney, 269, 390, 558
Sylvia deserticola, 258
ticehursti, 258
Sylviidae, 265
Syrmaticus, 264

TACHYCINETA thalassina lepida, 102, 347, 396, 455
Taeniaparadisea macnicolli, 259
Tanager, Cooper's, 355
Scarlet, 55, 391, 407
Summer, 600
Western, 329, 349
Tangara cabanisi, 280
Tangavius aeneus, 356
Tanner, James T., 'The Ivory-billed Woodpecker,' (rev.), 117
Taverner, P. A., Subspecific values, 306
Taxidermy, 284
Teal, Blue-winged, 25, 102, 156, 178, 345, 453
Cinnamon, 102
European, 283
Green-winged, 156, 538
"Southern Blue-winged," 454
Telematodytes palustris, 593
Temnotrogon roseigaster, 235
Tern, Arctic, 529, 581
Black, 102
Caspian, 102
Common, 574
Forster's, 102
Noddy, 455, 574
Sooty, 574
Terrill, L. McI., Nesting habits of the Yellow Rail in Gaspé County, Quebec, 171
Tetraonidae, 264
Thalurania furcata taczanowskii, 252
taczanowskii, 252
Thamnophilus major major, 352
Thowless, Herbert Lando, obituary, 640
Thrasher, Brown, 54, 391, 547
California, 329
Sage, 104, 354, 590
Thrush, 265
Thrush, Bicknell's, 593
Eastern Hermit, 354
Great Basin Hermit, 347
Gray-cheeked, 593, 595
Hermit, 54, 406, 596
Large Ant, 352
Olive-backed, 99, 172, 592, 596
Pacific Varied, 540
Red-bellied, 352
Sierra Hermit, 593
Willow, 607
Wilson's, 54
Wood, 53, 99, 107, 391, 548, 591, 599

Thryomanes bewicki correctus, 329
Thryothorus griseus, 253
ludovicianus, 391
Tinamidae, 265
Tinamou, 265
Titmouse, Tufted, 56, 106, 391
Topaza, 264
Totanus flavipes, 102
melanoleucus, 178
Towhee, 61, 104, 391
Arctic, 443, 607
California, 328
Red-eyed, 227
San Francisco, 227, 356
San Diego, 329
Spurred, 350
Toxostoma redivivum redivivum, 329
rufum, 391, 547
Tracy, J. Charles, Altitudinal nesting and breeding-range extension of the Wood Thrush, 591
Tragopan, 45
Tree-duck, Fulvous, 100
Treron australis, 255
a. pembaensis, 255
pembaensis, 255
Tribura idonea, 258
Tringa flavipes, 345
Tripsurus auritus, 572
Trochilidae, 264
Troglodytes aëdon, 389
aëdon aëdon, 406
a. parkmani, 397
Trogon melanocephalus, 235
rossi, 251
strigilatus, 235
violacea, 251
Trogonurus variegatus behni, 235
Tropic-bird, Yellow-billed, 284
Trotter, William Henry, obituary, 640
Trowbridge, Albert H. See Halloran, Arthur F., and —, 607
Tryngites subruficollis, 546
Turdidae, 265
Turdus avensis, 88
bensoni, 256
merula, 54
migratorius, 391, 596
m. achrusterus, 282, 548
m. migratorius, 56, 59, 61, 99, 282
Turdus migratorius propinquus, 352, 590
rufiventris rufiventris, 352
Turkey, Wild, 390
Turner, Emma Louise, obituary, 134
Turnstone, Ruddy, 520
Black, 156
Twomey, Arthur C., 'Needle to the North,' (rev.), 118
Tympanuchus, 45
cupido attwateri, 544
Tyrannus, 265
Tyranus tyrannus, 389, 590, 605
t. tyrannus, 97
verticalis, 590, 602
Tyler, Winsor Marrett, In memoriam: Glover Morrill Allen, 163
Tyto alba pratincola, 599
inexpectata, 255
nigrobrunnea, 255
novaehollandiae, 255

UNDERDOWN, Henry T., obituary of Anthony Wayne Robinson, 637
Uria aalge aalge, 582
a. californica, 539
lomvia lomvia, 530
Uttal, Leonard J., Two oddly-plumaged Ruffed Grouse, 266

VAN SCHAUBURG, Baron René Charles Eduard Georges Jean Snouckaert, obituary, 313
Van Tyne, 'Anting' by the Robin and Towhee, 61; A peculiar Goshawk from Labrador, 267
Veery, 103, 592, 596
Verdin, Arizona, 328
Vermivora celata celata, 451
chrysoptera, 391, 406
peregrina, 108, 178
ruficapilla ridgwayi, 329
Vidua principalis, 357
Vireo, 265
belli medius, 353
flavifrons, 391
gilvus swainsoni, 442
griseus griseus, 601
huttoni huttoni, 329
olivaceus, 99, 391
philadelphicus, 352

Vireo solitarius, 391
s. alticola, 352
s. plumbeus, 348
s. solitarius, 406
Vireo, 265
Blue-headed, 406
Hutton's, 329
Mountain, 354, 391
Philadelphia, 354
Plumbeus, 348
Red-eyed, 99, 391
Texas, 354
Western Warbling, 442
White-eyed, 600
Yellow-throated, 391
Vulture, 264
Black, 278, 390, 594
Turkey, 95, 390, 489, 594

WADE, J. S., review by —, 118
Wade, J. S., and Palmer, T. S., obituary of Harvey Adams Surface, 639
Wallace, George J., The 1940 nesting population at Pleasant Valley Sanctuary, Lenox, Massachusetts, 403
Walls, Gordon Lynn, 'The Vertebrate Eye,' (rev.), 292
Warbler, 406
Audubon's, 348, 451
Black and White, 108, 391, 442
Blackburnian, 391
Black-poll, 99, 108
Black-throated Blue, 108
Black-throated Gray, 329, 348, 452
Black-throated Green, 110, 391
Cairns's, 391
Calaveras, 329
Canada, 391
Cerulean, 275
Chestnut-sided, 108, 391
Eastern Yellow, 367
Golden-cheeked, 110
Golden Pileolated, 329
Golden-winged, 391, 406
Grace's, 348
Hooded, 391, 607
Magnolia, 108, 391
Orange-crowned, 451
Parula, 94, 276, 391, 597
Pine, 270
Warbler, Prairie, 391, 605
Red-faced, 348
Tennessee, 108, 178
Worm-eating, 391
Yellow, 389
Waterfowl, 156
Water-Thrush, 279
Louisiana, 391
Northern, 178, 406
Waxwing, 592
Cedar, 54, 328, 391
Weaver, Richard Lee, Reproduction in English Sparrows, 62
Weaver, Richard Lee, and West, Franklin H., Notes on the breeding of the Pine Siskin, 492
Weights, 210, 216, 221
Wellein, Edward G., Ring-necked Duck breeding in the Province of Quebec, Canada, 600
West, Franklin H. See Weaver, Richard Lee, and —, 492
Wetmore, Alexander, In memoriam, Joseph Harvey Riley, 1; The occurrence of feather impressions in the Miocene deposits of Maryland, 440; review by, 458; A second specimen of the fossil Guillemot, Miocepphus, 604
Wheatear, Greenland, 532
Whip-poor-will, 389
Widgeon, American, 286
European, 286
Willet, Eastern, 110
Western, 102, 590
Willett, George. [Letter from], 478
Williams, Cecil S., and Nelson, Marcus C., Canada Goose nests and eggs, 341
Wilsonia pusilla chryseola, 329
Wing, Leonard, Spread of the Starling and English Sparrow, 74; Relative distribution of Mallard and Black Duck in winter, 438
Woodcock, 159, 390, 405
Woodpecker, 265, 310, 405
American Three-toed, 106
Woodpecker, Downy, 90, 168, 391
Gila, 339
Hairy, 390
Ivory-billed, 160, 547
Lewis's, 590

Woodpecker, Northern Downy, 56
Pileated, 168, 390
Pygmy, 564
Red-bellied, 548, 599
Red-cockaded, 105
Red-headed, 548
Worth, C. Brooke, Notes on the Chimney Swift, 558
Wren, Carolina, 391
House, 389, 406
Long-billed Marsh, 177, 593
Northern Cactus, 328
Rock, 590
San Diego, 329
Short-billed Marsh, 177, 599
Western House, 397
Winter, 406
Wren-tit, 328
Wright, Philip L., and Hiatt, Robert W., Outer primaries as age determiners in gallinaceous birds, 265

XANTHOCEPHALUS xanthocephalus, 102, 353, 591
Xema sabini, 279, 529
Xenodacnis parina, 254
petersi, 254
p. bella, 254
Xenotriccus callizonus, 280

YELLOW-LEGS, Greater, 178
Lesser, 102, 345
Yellow-throat, 95
Maryland, 391
Salt Marsh, 355
Tule, 329
York, Olive R., Unusual nest of the Parula Warbler, 94
Yungipicus nanus nanus, 570
pygmaeus clementii, 566
p. tonkinensis, 569
scintilliceps kurodai, 566
s. nagamachii, 566

ZAVATTARIORNIS stresemanni, 259
Zenaidura macroura, 390
m. carolinensis, 546
m. marginella, 205
Zimmer, J. T., reviews by —, 112, 113, 117, 287, 288, 291, 292, 456–460, 609, 610, 612
Zimmer, J. T., and Mayr, Ernst, New species of birds described from 1938 to 1941, 249
Zonotrichia albicollis, 227, 407
botterii, 243
fallax, 245
leucophrys, 534
l. gambeli, 328, 591
l. leucophrys, 591
Zosterops atriceps dehaani, 260
chyuluensis, 260
dehaani, 260
virens chyuluensis, 260

THE AUK

A Quarterly Journal of Ornithology

ORGAN OF THE AMERICAN ORNITHOLOGISTS' UNION

Manuscripts should be typewritten if possible. As an aid in bibliography, title should be brief, within one printed line. References to literature may be inserted in parentheses at the appropriate places in the text, or listed at the end of the paper rather than in footnotes. Roman numerals and extensive tables are to be avoided. Line drawings intended for text illustrations should be in India ink; halftones can only be printed as plates. Longer articles should have a brief summary at the end. Except on request, no proofs of 'General Notes' or short communications will be submitted to authors.

Twenty-five reprints of leading articles are furnished authors free of charge. Reprints from 'General Notes,' 'Correspondence,' etc., and those from leading articles in excess of twenty-five must be paid for by the author, and must be ordered from the editor when the manuscript is submitted. Printed covers can be furnished at additional cost.

All articles and communications intended for publication and all books and publications intended for review should be sent to the Editor,

JOHN T. ZIMMER
American Museum of Natural History
79th Street and Central Park West
New York, N. Y.

Information relative to advertising, subscriptions, requests for back numbers of 'The Auk,' as well as for other publications of the Union, changes of address and remittances should be sent to the Treasurer and Business Manager. Claims for replacement of missing or defective copies of 'The Auk' will not be honored unless received by the Business Manager within six months of publication of the particular number involved.

J. FLETCHER STREET
1120 Locust Street
Philadelphia, Pennsylvania

OFFICERS OF THE AMERICAN ORNITHOLOGISTS' UNION

President: JAMES L. PETERS, Museum of Comparative Zoölogy, Cambridge, Massachusetts.

Vice-Presidents: GEORGE WILLETT, Los Angeles Museum, Los Angeles, California.

HOYES LLOYD, 582 Mariposa Ave., Rockcliffe Park, Ottawa, Canada.

Secretary: DR. LAWRENCE E. HICKS, Ohio Wildlife Research Station, Ohio State University, Columbus, Ohio.

Treasurer and Business Manager: J. FLETCHER STREET, 1120 Locust Street, Philadelphia, Pennsylvania.

TEN YEAR INDEX

TO

THE AUK

VOLUMES 48–57

1931–1940

Prepared by

H. S. SWARTH and GEORGE WILLETT

Edited by

GEORGE WILLETT

A 375 page volume containing a detailed index by authors, genera, localities and subjects to the articles, notes and reviews which have appeared in 'THE AUK,' during the 1931–1940 period, together with a full biographical index of the members of the Union who have died during the decade indicated.

A volume of particular value for reference and research purposes.

Now off the press in a limited edition in paper and in cloth.

Price in paper — $3.00
Price in cloth — $4.00

Address

AMERICAN ORNITHOLOGISTS' UNION

1120 Locust Street **Philadelphia, Pa.**

s,
e-
ne
x
ne

h.

a.